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PHOTO: ARALDO DE LUCA

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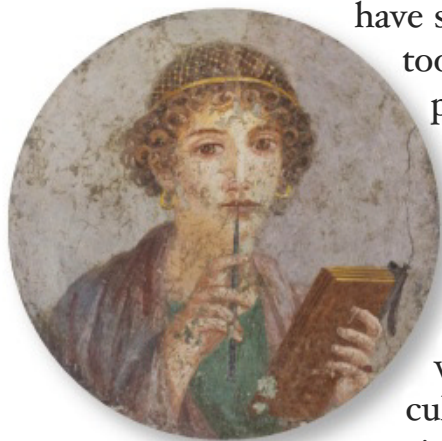


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EDITOR'S LETTER

PUTTING THE ANCIENT WORLD ON THE MAP

When we started planning our special feature “Mapping the Past,” we knew we wanted to bring you a wide range of maps from diverse cultures and time periods. We also wanted to broaden the concept of what constitutes a map by taking into account whatever people might wish to locate, including the stars, their stories, or a path through the afterlife. As we researched our choices, we wondered: How many maps have survived from antiquity? Were the materials used to create them too perishable to last? Would universal themes appear? Or would people from different cultures, places, and time periods map their worlds in unique ways? When we started to make our selections, we found that maps made of all sorts of materials—bronze, clay, papyrus, silk, marble, cotton, paper, and wood—had survived to be excavated and studied. Some universal themes did indeed emerge, most obviously people’s desire (or is it need?) to map the world around them. And the great variation in types of maps across cultures and periods often spoke to very particular local spiritual, spatial, and economic needs.



We are also excited to introduce you to a different sort of map in this issue of *ARCHAEOLOGY*. Some of the sites we cover are located in familiar places, but some are less well known, and thus we hope you enjoy the maps that will accompany many of our articles going forward. Whether a site is world-famous, like the tomb of Tutankhamun, which you will read about in “Inside King Tut’s Tomb,” or in the remote landscape of northern China, as in “China’s Hidden City” by contributing editor Jason Urbanus, the maps that accompany these articles will help you orient yourself in the different ancient worlds we feature in each issue.

When the author and geographer Pausanias wrote his *Description of Greece* in the second century A.D., he traveled across the country and described countless places of historical, cultural, and geographic interest along the way, creating visual and literary maps of a landscape that was already ancient by his time. Although Pausanias was particularly concerned with Greece’s most important sites, such as the sanctuaries of Apollo at Delphi and of Zeus at Olympia, he also notes physical details such as the wild strawberries on Mount Helicon and the pine trees on Elis’ sandy shores. We can’t promise the level of detail that Pausanias’ 10-volume opus affords, but we are confident that our maps will be informative and entertaining, and will provide yet another way for you to enjoy the stories of the past.

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FROM THE PRESIDENT

PLUMBING, PAST AND PRESENT

Shortly after a 1793 epidemic of yellow fever ravaged Philadelphia, the nation's capital at the time, the architect and engineer Benjamin Henry Latrobe described the city thus: "The backyards of most of the houses are also depositories of filth to a degree which is surprising....The houses being much crowded, and the situation flat, without subterraneous sewers to carry off the filth, every house has its privy and



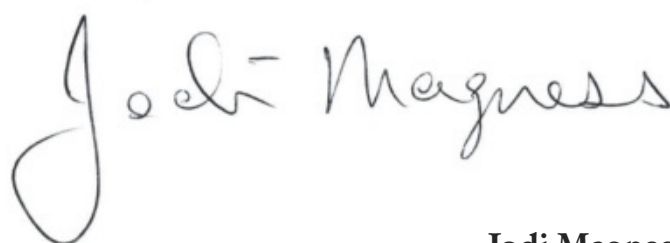
Public latrine, Ostia, Italy

its drains which lodge their supplies in one boghole sunk into the ground at different depths." Latrobe hypothesized that deeply dug cesspits had contaminated the underground aquifers that supplied most of the drinking water, causing the disastrous outbreak.

As a native of Philadelphia whose family had a plumbing supply business, I am particularly interested in the story of sanitation. As an archaeologist, I am fascinated by this history because the conditions Latrobe describes are similar to those in the Roman world. Most houses in the ancient Mediterranean and Near East were not equipped with toilets. Instead, residents used chamber pots, the contents of which were emptied into streets and alleys. Some cities such as Pompeii had raised sidewalks with high curbs along the streets so that pedestrians could cross on stepping-stones to avoid the filth. The waste was washed into underground sewers by overflow from public fountains.

In those rare ancient Roman houses that were equipped with toilets, a cesspit was dug into the floor of a room often located next to the kitchen, since the cesspit was also used for garbage disposal. The cesspits were not connected to the sewers, but were emptied by merchants who sold the contents as fertilizer. This ancient type of toilet is very similar to those described by Latrobe in late eighteenth-century Philadelphia, nearly 2,000 years later.

Public toilet facilities were almost unheard of in much of the ancient world. The luxury latrines in Roman bathhouses were an exception. These well-appointed and often highly decorated facilities consisted of a room lined with stone or wooden seats. Beneath the seats was a channel with running water brought by an aqueduct to carry waste away. However, many communities in the Roman world lacked public bathhouses equipped with such latrines, and not every urban dweller had access to these facilities even when they did exist. Roman luxury latrines set a standard for waste disposal that was unmatched in the West until the invention of modern flush toilets.



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FROM OUR READERS



ARTISTIC VISION

As an artist who also works with horses, I was captivated by the carved horse image on the stone tablet from Rocher de l'Imperatrice ("Art at the End of the Ice Age," March/April 2019). The carving appears to be a careful study done from a dead animal. The artist has realistically rendered the challenging angles of the hoof, fetlock, and pastern, but the horse's feet are not in contact with the ground. The limbs are not posed to support the animal's weight—even the limp nature of the tail suggests the horse is placed on its side. The loss of volume shown beneath the chin suggests a fairly recent death, before the onset of rigor mortis or bloating.

Jessica Madole
St. Paul, MN

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SECRET SOCK SOCIETY

As an anthropology student at The Evergreen State College, I studied color in science, history, and art. Thank you for sharing "A Lost Sock's Secrets" (January/February 2019). I learned to dye with indigo, madder, and weld for blue, red, and yellow, along with the practice of overdyeing to create more colors, such as purple, orange, and green. I'm still a dyer and I'm learning to cultivate madder in my garden along with Japanese indigo because true indigo won't grow here. Yellow is naturally abundant from plants like goldenrod, so I gather it in the wild.

Jamey Diane Taylor
Olympia, WA

BIBLICAL HISTORY

I read your article "Egypt's Eternal City" in the March/April 2019 issue. In it, the author states that Heliopolis is called On in Hebrew and is mentioned several times in the Old Testament. Would you please share these mentions?

Julia Riding
Basildon, Essex
United Kingdom

Andrew Curry replies:

Heliopolis is mentioned four times in the Bible: Genesis 41:45, 45:50, and 46:20, and Ezekiel 30:17. It may also be the "house of the sun god" referred to in Jeremiah 43:13 and the city mentioned in Isaiah 19:18.

HORSE TALES

I suspect that the preponderance of male horse skeletons in the grave sites discussed in "A Ride to Valhalla" (March/April 2019) had a pragmatic underlying rationale. Stud horses are notoriously sexually aggressive and, to be honest, generally more trouble than they're worth, especially in circumstances where the herd would have to be kept in close quarters and fed through the long subarctic winters. Mares are a better investment. A mare in foal has twice the productive value of a stallion unless the community has a single ungelded male to service the horse herd, at which point that male's value increases exponentially. Any other males are simply surplus.

Ken Sears
Lethbridge, Alberta
Canada

Albína Hulda Pálsdóttir replies:

I believe that Viking Age Icelanders did practice castration to manage male horses' sexual aggression. But it is difficult to sex horses morphologically—that is, by their physical structure—and we don't currently have any good methods to identify castrated horses from their bones. Thus, we don't know if Icelandic horse burials were stallions or geldings.

While females were valuable as breeding stock, I don't think male horses were surplus animals—they were also of great value in Viking Age Iceland and were specifically chosen for burials.



ARCHAEOLOGY (ISSN 0003-8113) is published bimonthly for \$29.95 by the Archaeological Institute of America, 36-36 33rd Street, Long Island City, NY 11106. Periodicals postage paid at Long Island City, NY, and additional mailing offices. POSTMASTER: Send address changes to Archaeology, P.O. 433091, Palm Coast, FL 32143.

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EPIC PROPORTIONS

More than a decade ago, archaeologists Andrew Chamberlain of the University of Manchester and Mike Parker Pearson of University College London began taking measurements at Stonehenge as part of their research at the site. They determined that the Neolithic monument's earthwork elements—including a ditch, a bank, and a ring of chalk pits—which form concentric circles around the iconic standing stones, all feature diameters evenly divisible by a single standard measurement, that is to say, with no fractions remaining. They termed this measurement the “long foot,” because it is equal to 1.056 modern feet. Chamberlain and Parker Pearson found that the distances between some of Stonehenge's megaliths could also be expressed as whole numbers of long feet. This led them to question how Stonehenge's builders had made the calculations necessary to build such a complex monument intended, at least in part, to track the movements of the sun and moon, and to ask what, exactly, were the builders using to take those measurements. Although they didn't know it at the time, the answer appears to lie in a group of puzzling Neolithic objects.

The four artifacts are known as the Folkton Drums and the Lavant Drum: three intricately carved chalk cylinders found in a child's grave in Folkton, East Yorkshire, in 1889, and one unearthed in a pit in Lavant, West Sussex, in 1993. For more than a century, the Folkton Drums have

been regarded as some of the most celebrated examples of Neolithic art in Britain. Although scholars immediately recognized the Lavant Drum's similarity to the Folkton Drums, no one knew what any of the artifacts had been used for 4,500 years ago.

In 2016, archaeologist Anne Teather, also of the University of Manchester, was researching all four drums when she realized that the smallest of the Folkton Drums had a circumference that appeared to equal one long foot. When Teather, together with Chamberlain, considered the circumferences of the other three drums, they noticed a stunning mathematical relationship—the drums' dimensions appeared to advance in a regular progression. To test their theory, they wrapped a cord measuring 10 long feet around a wooden model of the smallest Folkton Drum and found that it wound around exactly 10 times. They then calculated that the same length of cord would wrap around the next largest drum—the Lavant Drum—exactly nine times. Around the remaining two Folkton Drums, the cord would wrap exactly eight and seven times. Thus, they suggested, the drums, which are themselves ancient replicas of objects that would originally have been fashioned of wood, could have been used to make a sort of Neolithic tape measure. Further, they established that at least one standard measure had been used in Neolithic Britain—and even at Stonehenge itself. “We absolutely didn't try to marry some of the most enigmatic artifacts in Britain

Folkton Drums



FROM THE TRENCHES

to its most enigmatic monument,” says Teather. “The evidence led us to that.”

A standard measurement would have also been useful, says Chamberlain, because it is well known that many of Stonehenge’s stones were quarried 100 miles away in what is now western Wales. It’s possible that Stonehenge’s builders or their emissaries communicated specifications to the quarries using this standard measurement.

Stonehenge, Wiltshire, England



“Anyone who’s done any construction will know that if you get a piece of lumber and it’s too short, there’s not a lot you can do about it,” Chamberlain says. Instead of hauling stones to the construction site and trimming them on location, it now seems more likely that the megaliths were cut to order. “The drums show that it was possible to take that standard to the place where you’re quarrying to make sure the stones you’re getting are the right size,” Chamberlain explains. “That standard could then be shared with the community.”

—MARLEY BROWN

OFF THE GRID

NANGULUWUR ROCK ART GALLERY, KAKADU NATIONAL PARK, AUSTRALIA

Kakadu National Park in Australia’s Northern Territory, a roughly three-hour drive southeast from the territory’s capital, Darwin, is one of the greatest rock-art landscapes in the world. Recent archaeological excavations have pushed back the earliest dates of human presence in the region to around 65,000 years ago. More than 5,000 sites with petroglyphs have been recorded within the park’s 8,000 square miles. Pinning down the precise date of some of Kakadu’s rock art is challenging, as many of the mineral pigments used in the area are not datable using radiocarbon methods. Therefore, says Samantha McLean of Kakadu’s research and permits office, archaeologists and art historians have constructed timelines for the art using a combination of thermoluminescence dating, which can determine when mineral elements of paint or ceramics were first heated or fired, and representations of flora and fauna, which have changed over time along with the climate. Some of the most stunning images in Kakadu are found on or near Nourlangie Rock, a massive sandstone formation about a half-hour drive south from Jabiru, the park’s largest hub, which has facilities such as hotels and welcome centers. Another of the rock art sites, called Nanguluwur, was used as a campsite by ancestors of the Bininj/Mungguy people for millennia, and features an array of paintings and hand stencils ranging from several thousand to fewer than 100 years old. “Here you can see powerful depictions of ancestral spirits, animals, as well as fascinating early illustrations of contact between Aboriginal people and Europeans,” says McLean.

THE SITE

To experience the park fully can take several days. Visitors should begin their journey at the Warradjan Aboriginal Cultural Centre, where interpretive displays and presentations share the culture of Kakadu’s people. From there, it’s about

a 45-minute drive east along the Kakadu Highway following signs for Nourlangie Rock, which is also known as Burrunggui. There are no shuttles around the park, so visitors are encouraged to sign up with one of the many commercial tour operators or to explore in their own vehicles. From May to November, the park offers guided tours, talks, and activities, which are included in the entrance fee. A range of hotels, cabins, and campsites can be found near the park’s four main hubs. Once you reach Nangulu-



Nourlangie Rock

wur, the site and the nearby Anbangbang rock shelter have well-marked walking tracks and are protected by guardrails.

WHILE YOU’RE THERE

Nanguluwur is a short walk to the entrance to the Anbangbang billabong, the wetlands habitat of an impressive array of birdlife. Spread out your lunch on one of many picnic tables and raise your binoculars to catch sight of magpie geese, comb-crested jacanas, cormorants, and red-tailed black cockatoos, to name only a few of the avian species you might see.

—MARLEY BROWN

Kakadu National Park, Australia



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FROM THE TRENCHES

STABBED IN THE BACK



Medieval skeleton, Sicily, Italy

The skeleton of an eleventh-century man who appears to have been executed has been unearthed in central Sicily. When archaeologists led by Roberto Miccichè of the University of Palermo found the remains in a shallow grave, they immediately realized they had an unusual case on their hands. The man had been buried facedown, in a manner that did not follow any of the religious practices common in Sicily at the time. This suggests that he was an outlaw.

As Miccichè studied the bones using CT scans and a 3-D reconstruction, he

recognized that the victim had been stabbed in the back at least six times, most likely while kneeling with his feet bound together. This is evidence of “someone very familiar with human anatomy carrying out a kind of ‘surgical operation’ intended to kill a person in a very effective and rapid way,” says Miccichè. He points out that the execution likely took place just after the Norman conquest of Sicily in 1061, a time of social upheaval when violence on the island was common.

—DANIEL WEISS



Sternum showing stab wounds

A FOX IN THE HOUSE

Four foxes buried alongside women at prehistoric sites in northeastern Spain offer insight into the value Bronze Age Iberians placed on their animal companions. The animals were unearthed in three graves dating to the end of the third to the beginning of the second millennium B.C. at the Catalan sites of Can Roqueta and Minferri. More than 30 dogs were also found. Isotope analysis of the foxes' bone collagen suggests that they were regularly fed by villagers, most likely women, whose diet sometimes differed from that of men.



European red fox

For example, at Can Roqueta, men ate more meat than women. “Foxes are associated with women, not only in the

grave but also in what they ate,” says Aurora Grandal-d’Anglade of the University of A Coruña. “The foxes show isotopic signatures consistent with a diet similar to those of women and children.” While dogs at both sites appear to have been bred for daily tasks such as bearing loads, the foxes were likely free to wander. “I think the foxes were probably friendly animals used to humans,” Grandal-d’Anglade says. “It’s possible that women and children found it entertaining to attract and feed them.”

—MARLEY BROWN

TIGRESS BY THE TAIL



Bronze tigress
and cub

A belt buckle featuring a whimsical depiction of a tiger and its cub has been unearthed in the city of Cheongju in South Korea. The third-century A.D. bronze artifact depicts a crouching tigress with her mouth wide open, as if roaring, and a tiny cub in the same pose seated on her tail. Although tiger-shaped belt buckles have been found in the past, this is the first excavated example of a mother and baby tiger. It is also the first tiger-shaped buckle to have been discovered at Cheongju, a site belonging to the Mahan Confederacy, which existed between the first century B.C. and third century A.D. on the southern Korean peninsula, and about which little is known.

—HYUNG-EUN KIM





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Limestone
stela

FAMILY SECRETS

At Tell Edfu in southern Egypt, in a large villa dating to the beginning of the 18th Dynasty (ca. 1500–1450 B.C.), archaeologists have found evidence of the rise and fall of an elite couple. Near a small fireplace and offering table, they discovered objects including a carved limestone stela of a man and woman standing together. On the stela's frame, hieroglyphic text identifies the man with the titles mayor and overseer of priests, the most important positions in the administration of Tell Edfu and its temple. This couple and their descendants, all of

whom inhabited the villa, were members of an important family at a time when the rulers in the capital city of Thebes sought to consolidate their power by forging alliances with nobles in the south. At some point, the couple's faces and names were hacked away for unknown reasons. "Somehow these family members had fallen out of favor, and their names were removed from the collective memory," says Egyptologist Nadine Moeller, director of the University of Chicago's Tell Edfu Project.

—BENJAMIN LEONARD

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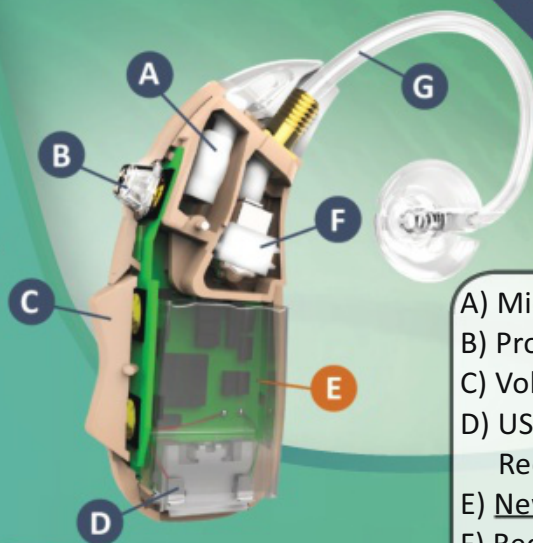


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FROM THE TRENCHES

COLD WAR STORAGE



Nuclear warhead bunkers, Poland



Ventilation shafts

In the late 1960s, the Soviets commissioned a trio of bases designed to store nuclear warheads in remote, forested areas of western Poland. The warheads, which ranged from 0.5 to 500 kilotons each, were intended to be fired at areas of West Germany and Denmark. Although the bases were secret, and attempts were made to camouflage them, the CIA had definitively identified their purpose by 1972.

Now, using declassified satellite imagery, airborne laser scanning, and on-the-ground exploration, Grzegorz Kierszys of the University of Szczecin has carried out the first archaeological investigation of the bases. Little remains at the sites apart from the bunkers used to store the actual warheads. When they were operational, however, Kierszys knows from archival photographs and the contents of trash pits, the bases included facilities to support not just the military personnel responsible for maintaining the warheads, but their families as well. “The Russian generals created an illusion of everyday, normal life at the bases,” says Kierszys. “There were soccer fields, playgrounds, and kindergartens at every base.”

—DANIEL WEISS

MARROW OF HUMANITY

Consuming the meat of large animals is generally thought to have been instrumental in human evolution. It allowed early hominins, such as australopithecines, to begin developing larger brains some 3.4 million years ago. At a time when early hominins were not yet able to manufacture and hunt with sophisticated tools, however, obtaining meat from animals that significantly outweighed them was a dangerous undertaking. Researchers now believe that our human ancestors may have first acquired the taste for meat by scavenging carcasses left behind by other predators. Even if most of the meat was rotten or had

already been consumed, early hominins may have used stones and other tools to smash open bones and access fatty marrow deposits, an invaluable source of the nutrients required by their very large brains. “Targeting marrow not only enables a stone-wielding hominin to access a novel resource that can’t be accessed by most other carnivores, but it was a relatively low-risk food,” says Yale University paleoanthropologist Jessica Thompson. This combination of high caloric returns at a low cost may have served as the ideal gateway to a long-standing carnivorous habit.

—JASON URBANUS

MAYA BEEKEEPERS



Clay head

tube with covers at each end. Initially, Zralka and his colleagues thought the artifact might be a drum buried as an offering. But they soon learned that the tube was nearly identical to wooden beehives still made from hollow

Evidence of the handiwork of early Maya beekeepers has been unearthed at the ancient city of Nakum in northeastern Guatemala. Beneath a vast ritual platform dating from around 100 B.C. to A.D. 300, a team led by

Jagiellonian University archaeologist Jaroslaw Zralka discovered a foot-long, barrel-shaped ceramic



Ceramic beehive

logs by Maya in the northern Yucatan. Most pre-Columbian beehives were also likely made from wood, but none of these have been discovered. The Nakum tube is the only known surviving example of an ancient Maya beehive.

“Honey was probably among the most popular products exchanged and traded by the pre-Columbian Maya,” says Zralka. “So beekeeping was a very important activity in their daily life, as well as in religious activities.” Near the beehive, Zralka and his team found nine unbaked clay heads arranged in a circle, perhaps depicting gods important to the continued success of Nakum’s beekeepers.

—ERIC A. POWELL

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FROM THE TRENCHES

ROMAN SOLDIER SCRIBBLES



Stone quarry,
Cumbria, England



Roman graffiti depicting Agricola

While gathering material from a stone quarry in Cumbria's Gelt Woods for renovations to nearby Hadrian's Wall, Roman soldiers carved personal inscriptions, funny cartoons, and "good luck" phallic symbols into the rock face. This 1,800-year-

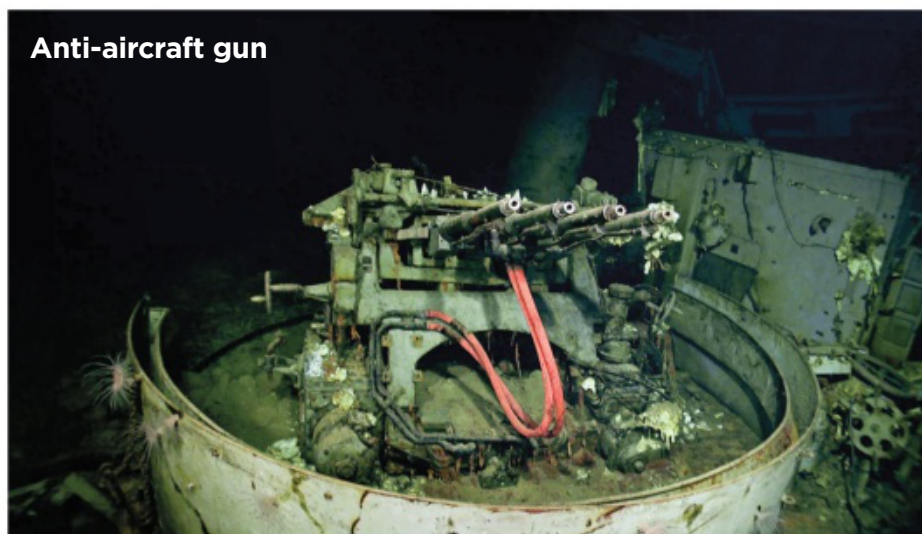
old graffiti is now being documented by archaeologists from Historic England and Newcastle University. One soldier seems to have etched a humorous caricature of his perhaps overly demanding boss, Agricola. "This was hard and potentially dangerous work that they

were doing and this is a really human reaction to that environment," says Historic England's Mike Collins.

Equipped with laser-scanning technology, archaeologists were suspended 30 feet down the quarry face to document the graffiti, which was first discovered in the eighteenth century. In the process, they identified several previously unknown examples. Because the inscriptions record names, ranks, military units, and even a date corresponding to A.D. 207, they are direct evidence of the early third-century building project to refortify Hadrian's Wall. Researchers will use the images to create a 3-D model of the rock face.

—JASON URBANUS

UNDERSTANDING *HORNET'S* FATE



Anti-aircraft gun

On the evening of October 26, 1942, the Yorktown-class aircraft carrier USS *Hornet* sank to the bottom of the South Pacific during the Battle of the Santa Cruz Islands, ending a brief but storied career that included a pivotal role in the Battle of Midway. Now, with the aid of U.S. and Japanese naval records, the crew of Research Vessel *Petrel* has located the wreckage of *Hornet* near the Solomon Islands, almost 17,500 feet underwater. "There's no current at that depth, so the level of preservation is in many ways pristine," says underwater archaeologist Robert Neyland of the Naval History and Heritage Command, who accompanied *Petrel's* crew on the expedition.

The first evidence of damage to *Hornet* that *Petrel's* crew documented—the result of Japanese bomb and torpedo attacks, as well as the U.S. Navy's attempts to scuttle her—corroborates survivor accounts. Damage from the later violent torpedo attack that finally sank the carrier, however, was revealed to be more extensive than previously known. The team also found personal effects, including a coat still hanging from a door near the stern, that offer a glimpse of the lives of the 2,512 men aboard *Hornet*, 129 of whom perished in the battle.

—BENJAMIN LEONARD



Sinking of *Hornet*, 1942

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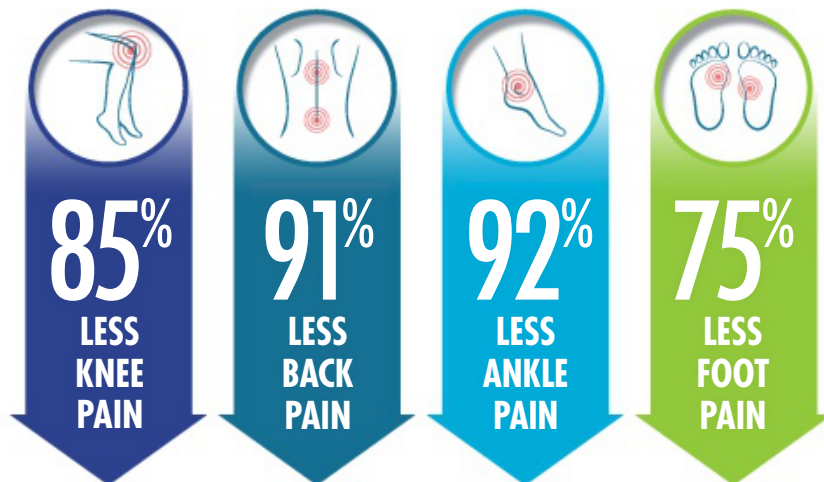
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VIKING WARRIORESS

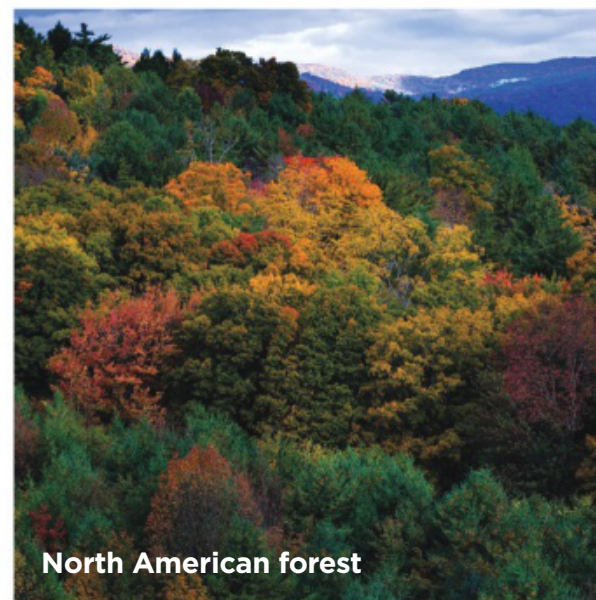
Whalebone game pieces and iron weapons

A richly furnished grave excavated in 1878 near the Viking town of Birka in eastern Sweden had long been assumed to hold a powerful male warrior. The grave was equipped with an arsenal of weapons, as well as a set of gaming pieces and a gaming board, which were seen as indications that the deceased was a military commander. A pair of horses was also found in the grave, one bridled as if prepared to ride off into battle once again in the afterlife. More than a century later, several osteologists concluded—and genetic analysis confirmed—that this Viking warrior was actually female.

When these results were reported in 2017, skeptics wondered whether there had been a testing mistake, or, perhaps, whether the person in the grave had not been a warrior after all. A new review of the evidence led by Neil Price of Uppsala University concludes that the person in the grave was indeed biologically female, and that there is no reason to doubt that she was a warrior in a position of great authority. “Ever since its excavation, the burial has been interpreted as that of a high-status warrior,” says Price. “We think so, too, for exactly the same reasons as everyone else has always thought so—but in light of the new sex determination, she was a female high-status warrior.”

—DANIEL WEISS

COLONIAL COOLING



North American forest

One surprising effect of European colonization of the Americas was a cooling of the Earth’s climate, researchers at University College London have determined. The team, led by geographer Alexander Koch, estimates the indigenous population of the Americas at the end of the fifteenth century to have been around 60 million. Over the next century, this population declined by some 90 percent, largely due to epidemics introduced by Europeans. As a result, around 215,000 square miles of cultivated land, roughly the area of France, was left fallow and reverted to forest. This sucked up enough carbon dioxide—a greenhouse gas that traps heat in the atmosphere—to lead to cooling.

This process took place amid an extended cold stretch known as the Little Ice Age, which lasted from around 1250 to 1850. Other factors that contributed to cooling during this period included numerous widespread volcanic eruptions and natural fluctuations in solar radiation. But, Koch says, the effects of colonization played a key role in driving temperatures down in the early seventeenth century, adding, “This is thought to be the coolest part of the Little Ice Age.”

—DANIEL WEISS

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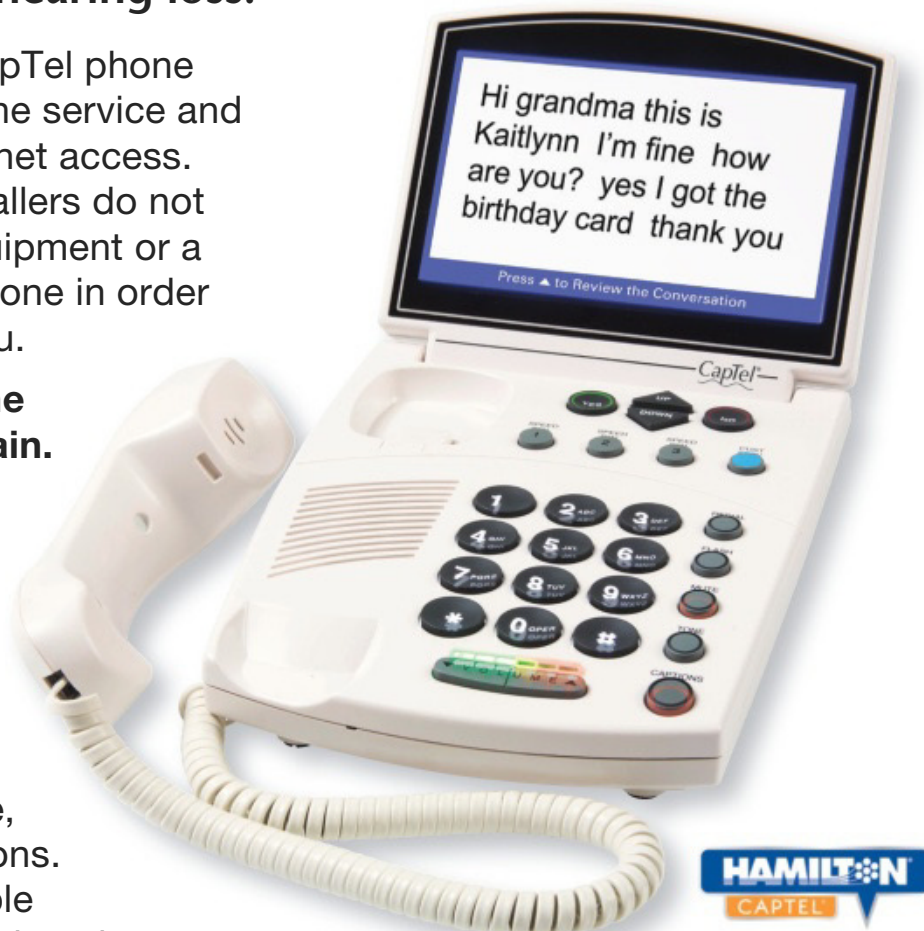
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FROM THE TRENCHES

TEMPLE OF THE FLAYED LORD

Each spring as new plants sprouted from the ground, the ancient cultures of Mesoamerica, including the Aztecs, understood the event as the earth growing a new skin. This idea was embodied by the god Xipe Totec, who was often depicted wearing a flayed human skin. The deity was thought to cause crops and other plants to grow. Archaeologists led by Noemí Castillo Tejero of Mexico's National Institute of Anthropology and History recently uncovered the earliest known temple of the "Flayed Lord" at the Ndachjian-Tehuacan archaeological zone in the Mexican state of Puebla.

The temple complex was built by the Popoloca people around A.D. 900. There, the archaeologists have found a large pyramid with two circular altars where, they believe, prisoners of war were given as sacrifices to honor Xipe Totec after they were



Ndachjian-Tehuacan, Puebla, Mexico



Ceramic effigy

killed in gladiatorial combat. They also unearthed two large skulls carved from imported volcanic stone, as well as the torso of a ceramic effigy of the god, which appears to have an extra hand hanging from the left arm. The archaeologists suggest this sculpture represents Xipe Totec wearing the skin of a sacrificial victim, a particularly macabre way to commemorate nature's cycle of life and death.

—ZACH ZORICH

CELTIC CURIOSITY

The most intriguing find from recent excavations at the seventeenth-century manor house known as the Wimpole Estate in Cambridgeshire, England, is a second-century A.D. copper alloy figurine of Cernunnos, the Celtic god of fertility, animals, and the underworld. Cernunnos is often shown, as he is here, in a squatting position



Bronze Cernunnos figurine

with a circular torc, or neck ring, in his hands. The figurine formed "part of a utilitarian object, possibly the handle of a Roman spatula for clearing wax tablets," says archaeologist Paddy Lambert of Oxford Archaeology East. After it broke, he says, the Cernunnos figurine was likely buried near a shrine.

—BENJAMIN LEONARD

SUBMERGED SCOTTISH FOREST



Tidal pool, Benbecula, Scotland



7,000-year-old wood



Quartz tool and bone

When a local resident noticed a partially fossilized tree protruding from a peat tidal pool on the island of Benbecula in Scotland's Western Isles, she alerted archaeological authorities. This led to the identification of a 7,000-year-old submerged forest. Although Benbecula today is mostly treeless, researchers now know that thousands of years ago it was covered by dense pockets of willow, birch, and Scots pine. "By looking at the wood, pollen, and other microfossils we can learn an enormous amount about what the islands were like before humans arrived and can study the impact of people on the natural vegetation," says University of St. Andrews archaeologist Joanna Hambly.

As Hambly and her team mapped the location of around 300 trees, they discovered traces of human activity dating to around 1700 B.C., including stone walls, grinding stones, butchered animal bones, and quartz stone tools. "If the butchered animal remains and the quartz tool assemblage are associated with each other—and it looks that way—this would be a very rare survival of a moment frozen in time," says Hambly. "We can learn about the decision-making processes, technology, and skill of the people who made the tools and processed the animal."

—JASON URBANUS

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CANADA: Several unassuming rock walls along the shore of Quadra Island are actually the ruins of ancient clam gardens constructed by First Nations peoples thousands of years ago. The walls were erected within

intertidal zones to create sandy terraces, ideal habitats for shellfish such as littleneck and butter clams. Radiocarbon dating of organic material sampled from one wall indicates it was built nearly 3,500 years ago, making it the oldest known aquaculture system of its kind.

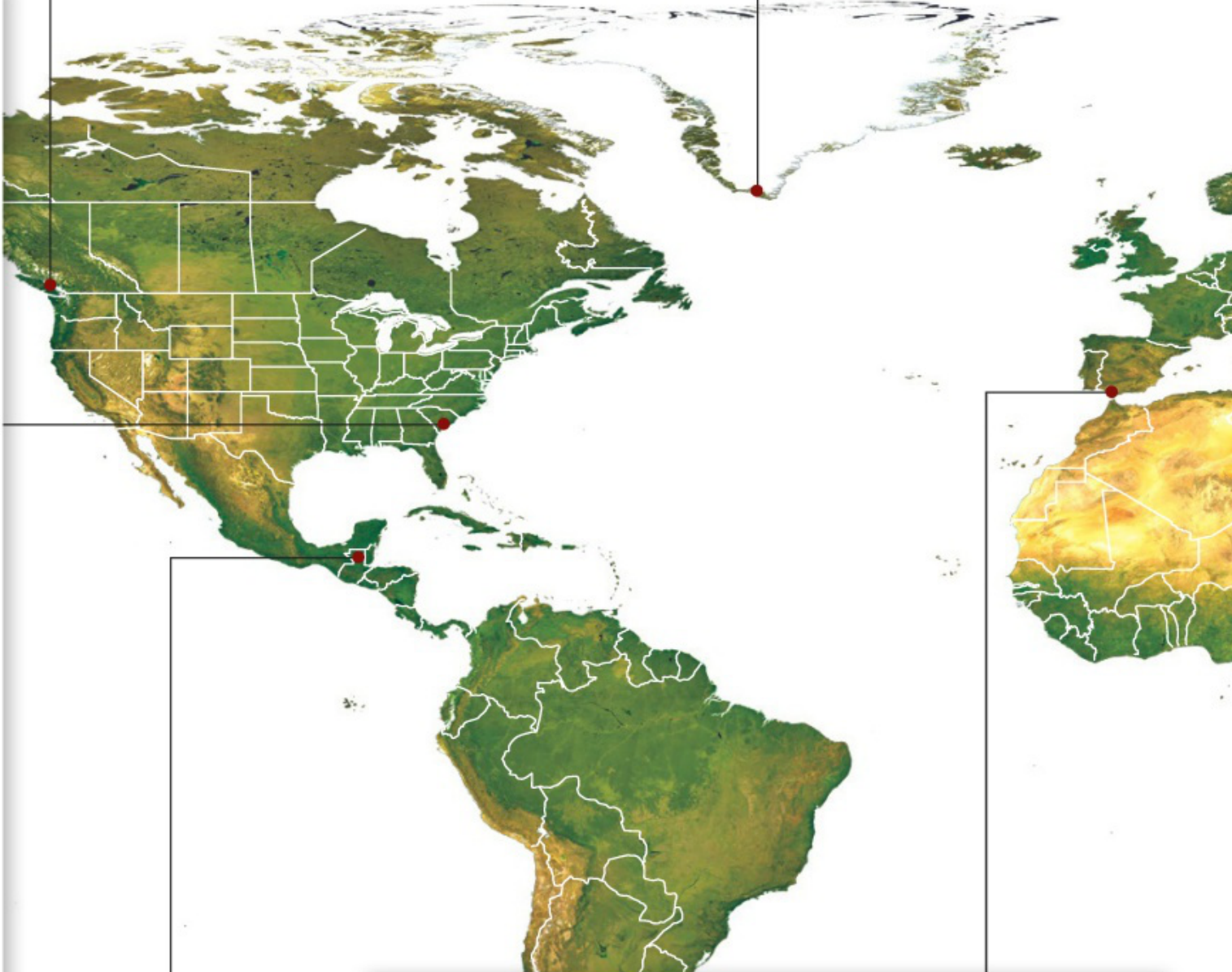


GREENLAND: Viking legend holds that Erik the Red devised the name “Greenland” in order to attract settlers to the notoriously cold island. A new study suggests the name wasn’t so misleading after all. By analyzing

oxygen isotopes from flies trapped in ancient lake sediments, scientists concluded that summer temperatures on the island regularly reached 50°F during the age of Norse colonization (10th–15th centuries). When the climate cooled dramatically at the end of this period, the Norse settlements disappeared.



SOUTH CAROLINA: A piece of Charleston’s history was revealed when construction workers encountered a section of the city’s colonial defensive network. Charleston was one of the most heavily fortified English colonial cities in America. Its defenses offered protection against potential Spanish and French attacks. Construction began on a red brick wall along the city’s waterfront in the late 17th century, but the structure was dismantled after the Revolutionary War. Very few traces remain visible today.



GUATEMALA: Divers have found hundreds of intact Maya artifacts lying 500 feet underwater in Lake Peten Itza. The objects, which

include ceramic bowls, incense burners, obsidian knives, and musical instruments, were likely thrown into the lake during ritual ceremonies. Water was sacred to the Maya, as it was seen as a portal between the living and the dead. Many Maya rituals involved lakes and cenotes.



SPAIN: Animals including red deer, ibex, aurochs, leopards, and even elephants living near the Rock of Gibraltar left their tracks in the peninsula’s large coastal sand dunes some 29,000 years ago. Alongside the animal tracks, archaeolo-

gists have also identified the likely footprint of a Neanderthal, which would be only the second such impression ever recorded. Modern humans replaced Neanderthals throughout Europe around 40,000 years ago, but a small population is thought to have survived a bit longer at the continent’s southernmost point.

MONGOLIA: New dating of a skull originally dubbed *Mongolanthropus* has revealed it is 8,000 years older than once thought, and actually belonged to a modern human. When the 35,000-year-old hominin fossil was first uncovered in the Salkhit Valley, it was thought to belong to a previously unknown species. Recent DNA analysis has shown that the remains are undoubtedly *Homo sapiens*, making it the earliest known human bone fragment ever found in the region.



RUSSIA: Today, Zhokov Island lies more than 300 miles north of mainland Russia, far beyond the Arctic Circle. Around 9,000 years ago, though, when it was still attached to Siberia, the area was home to a surprisingly well-connected and mobile community. Obsidian tools discovered on the island came from a source more than 900 miles away. It is believed that Mesolithic Zhokovians traveled by dogsled to acquire the material, although it is unclear whether they trekked the entire way or met obsidian traders somewhere along the route.

CHINA: A wealthy individual living 2,000 years ago in Henan Province was buried with an assortment of fine bronze, jade, and ceramic objects. Amid this trove was a jar containing a yellow liquid, which chemical analysis has revealed to be a mixture of potassium nitrate and alunite—and not rice wine as first thought. The minerals are the main ingredients of the legendary “elixir of immortality” mentioned in ancient Chinese texts. This potion was said to bring eternal life to whoever drank it, though, at least in this case, it doesn’t appear to have succeeded.



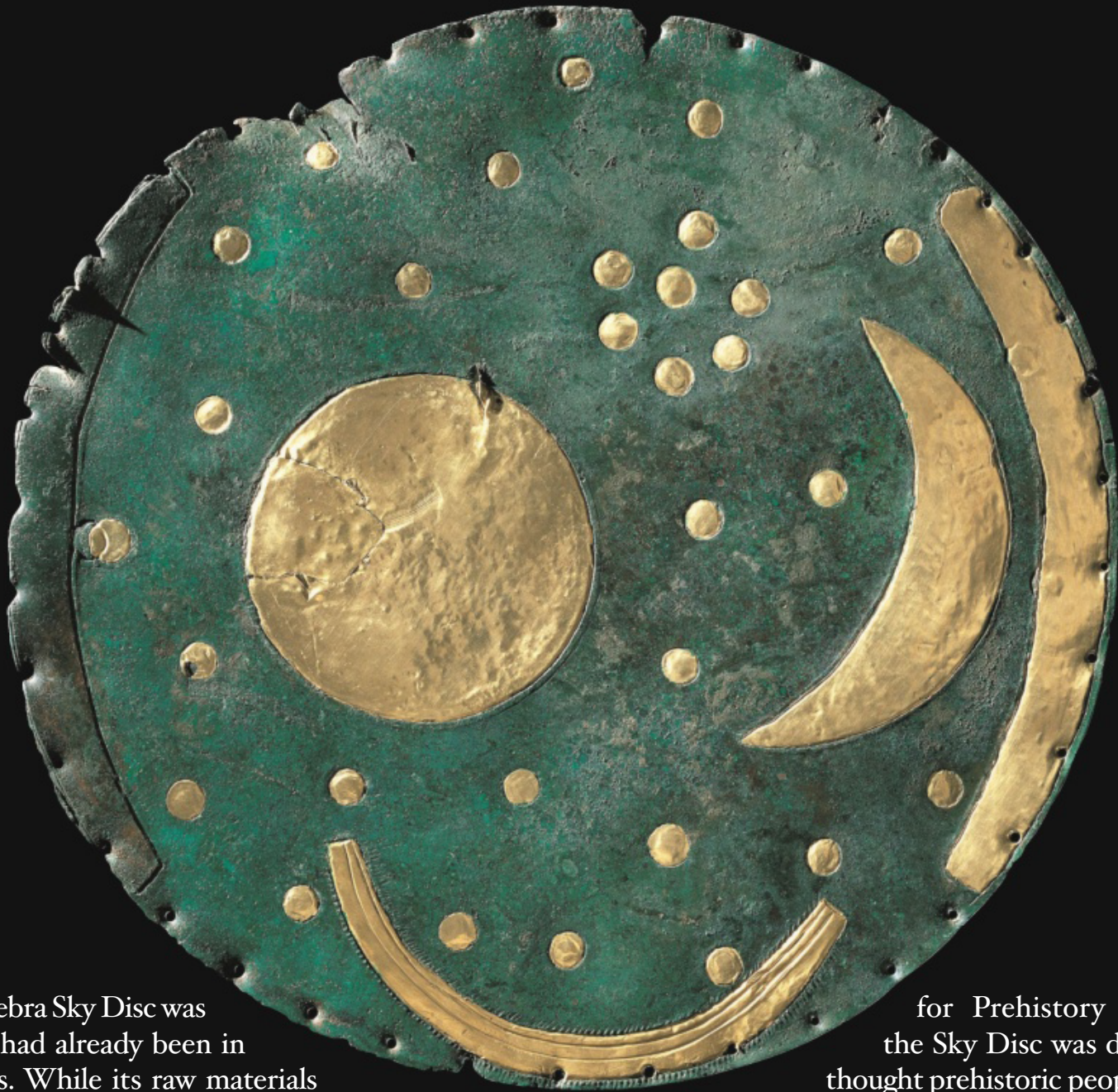
JORDAN: Humans and dogs have been best buddies for thousands of years, although for exactly how long is debated. Canine bones from a site called Shubayqa 6 indicate that the mutually beneficial relationship dates back at least 11,500 years. Researchers found a sharp increase in the number of small-animal bones at the site dating to this same period. This suggests dogs may have helped humans catch smaller, more elusive prey such as hares, perhaps by driving them into nets or enclosures.



AUSTRALIA: On the Dampier Archipelago off the northwest coast of Australia, there are an estimated 1 million Aboriginal petroglyphs. There are also some made by American whalers in the mid-19th century. The recently discovered engravings were left by crewmen from the ships *Connecticut* and *Delta*, who documented their journeys to the other side of the world. The inscriptions include the ships’ names, names of crewmen, sailing dates, and even a crudely drawn rope and anchor. They represent the earliest known evidence of American whalers in the area.

Mapping the Past

Exploring the genius and creativity of mapmakers through time



When the Nebra Sky Disc was buried, it had already been in use for 200 years. While its raw materials were imported from as far away as Cornwall, the knowledge required to create the object was entirely local, drawn from observing the heavens from atop Mittelberg, a mountain near the modern village of Nebra. The bronze disc—the world’s oldest representation of a specific astronomical phenomenon—had five phases over its history. In the first phase, the disc showed the night sky with 32 gold stars, including the Pleiades, a gold orb representing the sun or a full moon, and a crescent moon. It served as a reminder of when it was necessary to synchronize the lunar and solar years by inserting a leap month. This phenomenon occurred when the three-and-a-half-day-old moon—the crescent moon on the disc—was visible at the same time as the Pleiades. “The astronomical rules that are depicted wouldn’t be imaginable without decades of intensive observation,” says Harald Meller, director of the State Museum

for Prehistory in Halle. “Until the Sky Disc was discovered, no one thought prehistoric people capable of such precise astronomical knowledge.”

Artisans next added two golden arcs to the sides of the disc, hiding two original stars. The arcs, one of which was later removed, show the horizons as seen from Mittelberg on the summer and winter solstices. At some unknown time, a stylized ship was affixed at the bottom as an allegorical symbol of the sun’s journey across the sky. “One of the most fascinating aspects of the Sky Disc is that its first two phases show the results of pure observation, astronomical knowledge without any religious or mythological implications,” says Meller. “It’s only in the third phase that these aspects, represented by the ship, are added.”

Next, holes were bored around the disc’s edge, probably to attach it to a pole to be carried as a standard. Finally, in around 1600 B.C., the disc, perhaps no longer of either scientific or religious use, was buried, likely as an offering to the gods.

—JARRETT A. LOBELL

THE NEBRA SKY DISC

DATE: ca. 1800 B.C.

MATERIAL: Bronze and gold

DIMENSIONS: 1 foot diameter, weight 4.6 pounds

FOUND: Saxony-Anhalt, Germany

NIPPUR MAP TABLET

DATE: ca. 1500 B.C.

MATERIAL: Clay

DIMENSIONS: 5 inches by 4.3 inches

FOUND: Nippur, Iraq

For the busy farmers of the Babylonian sacred city of Nippur, ready access to water was essential. It's hardly surprising, then, that this tablet, which maps an area near the city, features a complex irrigation network of ditches and canals, depicted by lines, along with a number of towns and agricultural estates, represented by circles. What is somewhat surprising, though, is that a map of the area was produced at all. Landholdings in Mesopotamia were typically described rather than drawn, explains Philip Jones, a curator at the Penn Museum. "It's difficult to put your finger on why this map was created," he says, "but it must have been for some administrative purpose."

The map's central section, identified in cuneiform writing as a "field of the palace," suggests that the tablet served as a guide to estates belonging to the recently established Kassite Dynasty, which was based in the city of Babylon, around 70 miles northwest of Nippur. At this time, the region's new Kassite rulers were challenging the religious establishment in Nippur, which had long been the seat of the chief Sumerian god, Enlil. The top center section of the tablet includes an estate and field of Marduk, the patron god of Babylon. Says Jones, "What we see here is that Marduk is beginning to usurp Enlil's place and is actually getting land within Enlil's own city."

—DANIEL WEISS





The world's oldest known geological map is a nine-foot-long papyrus from the Egyptian village of Deir el-Medina, home to the New Kingdom craftsmen who worked in the Valley of the Kings. Created by Amennakhte, the chief scribe of the royal necropolis, the papyrus depicts a dry riverbed called the Wadi Hammamat in Egypt's eastern desert. The wadi had been used for quarrying and mining for centuries, and as a route connecting the Nile Valley to the Red Sea for millennia. No map would have been needed for general travel, according to Egyptologist Andreas Dorn of Uppsala University and linguist Stéphane Polis of the University of Liège. Instead, the papyrus was created as a commemorative record of a pharaonic expedition, perhaps during the reign of Ramesses IV (r. ca. 1153–1147 B.C.), to a bekhen-stone quarry. Bekhen-stone, or greywacke, was prized for use in high-quality sculptures. To distinguish types of stone, Amennakhte employed dark brown to repre-

sent bekhen-stone, pink for deposits of granite and gold, and spots for alluvial deposits.

The scribe also included quarried bekhen-stone blocks with their measurements, seen on the fragment at the far right, as well as roads and directions in hieroglyphs, such as "road leading to the sea." Amennakhte also drew natural and built landmarks including small trees, bushes, and a well, along with a monument to Seti I (r. ca. 1294–1279 B.C.) and a temple to the god Amun, both illustrated in white at the far left. "Amennakhte definitely had experience visualizing complex structures, as he was also responsible for drawing tombs. He was able to represent topographical information by flattening out such things as roads and the natural environment," says Polis. "This unique document mixes geographical and geological information in a way that anticipates many of our modern mapmaking practices."

—JARRETT A. LOBELL

In 168 B.C., a lacquer box containing three maps drawn on silk was placed in the tomb of a Han Dynasty general at the site of Mawangdui in southeastern China's Hunan Province. The general was most likely the son of Li Cang, the ruler of the Changsha Kingdom—a fiefdom of the Han Empire—whose own well-appointed tomb lay nearby.

Each map presents a section of the Changsha Kingdom. One map, now largely in tatters and difficult to read, seems to show a city or mausoleum. Another focuses on the locations of military garrisons in a region that lay near Changsha's frontier with a fractious neighboring kingdom. The third map, shown here, illustrates the mountains, rivers, and important settlements of the southern half of Changsha.

The Mawangdui maps demonstrate a high



HAN DYNASTY TOPOGRAPHIC MAP

DATE: Before 168 B.C.

MATERIAL: Ink on silk

DIMENSIONS: 3 feet by 3 feet

FOUND: Hunan, China

degree of standardization, especially in their use of abstract signs, such as squares to symbolize cities, says Cordell Yee, a cartographic historian at St. John's College in Annapolis. He points out that the maps are so sophisticated that they were likely produced according to long-established cartographic traditions. "This suggests mapmaking was already well developed in China by this time," says Yee. The maps were undoubtedly indispensable for administrative and military planning purposes, but they may also have been enjoyed as works of art. Next to depictions of a prominent mountain range, the Jiuyi Shan, or Nine Beguiling Mountains, the dark area at the far left, the mapmaker carefully drew in shadowy images that may depict the reflection of the peaks in a nearby lake.

—ERIC A. POWELL



THE GOLDMINE PAPYRUS

DATE: ca. 1151-1145 B.C.

MATERIAL: Papyrus

DIMENSIONS: 9 feet by 1.3 feet

FOUND: Deir el-Medina, Egypt

The *Forma Urbis Romae*, or map of the city of Rome, was a massive plan of the layout of the city under the emperor Septimius Severus (r. A.D. 193–211). Although only a small portion of the plan survives, scholars are relatively certain it illustrated most of the city. This fragment shows commercial structures on the southeastern slope of the Viminal Hill. The *Forma Urbis* adorned the wall of a room in Rome's Temple of Peace that might have served as an archive of maps and records. Drawn at a scale of 1:240, the plan resembles a land surveying map, in that it includes not only streets and blocks, but also interior features of buildings, such as colonnades and staircases. However, its

FRAGMENT OF THE *FORMA URBIS ROMAE*

DATE: A.D. 203–211

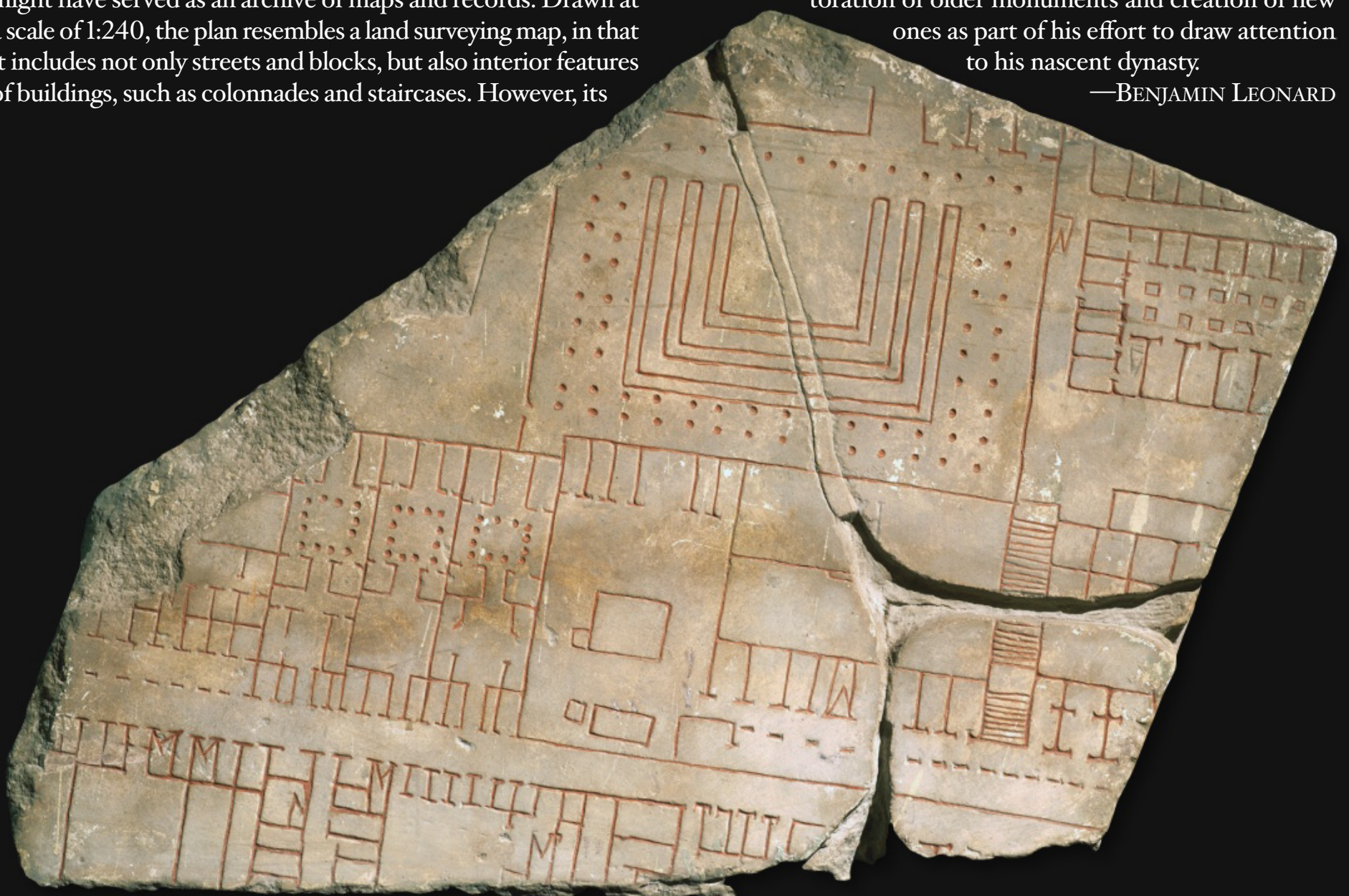
MATERIAL: Marble

DIMENSIONS: 26 inches by 23.6 inches

FOUND: Rome, Italy

monumental size—60 feet by 43 feet—suggests a decorative rather than practical function, says archaeologist Susann Lusnia of Tulane University. “The *Forma Urbis* provided an overview of the changes made to Rome by Severus in his quest for legitimacy and establishment of his dynastic succession,” she says. “The marble plan was itself a monument to the Severan legacy in Rome.” Severus’ ambitious building program included both restoration of older monuments and creation of new ones as part of his effort to draw attention to his nascent dynasty.

—BENJAMIN LEONARD





THE PARACAS TEXTILE

DATE: A.D. 100–300

MATERIAL: Cotton and camelid fiber

DIMENSIONS: 2 feet by 4.9 feet

FOUND: Paracas, Peru

For some people in the ancient Andes, textiles could serve not only as a record of their physical surroundings, but also as guides to aid in the transition to the next world. This textile, which was likely wrapped around the head of a member of the pre-Columbian Nazca culture of Peru when he or she was buried, “represents a record of what life was like on Peru’s south coast 2,000 years ago,” says curator Nancy Rosoff of the Brooklyn Museum. The pattern at the center of the textile repeats a large-eyed, grinning figure thought to depict a supernatural being. The outer border shows a procession of 90 individual figures, each adorned in distinct regalia. Many carry animals and plants native to the surrounding area or found farther afield.

The mantle might also be seen as a map representing the Andean concept of cyclical time, according to geographer William Gartner of the University of Wisconsin–Madison. The figures on the textile’s border illustrate the movement of people around a village plaza. With the cloth wrapped around his or her head, says Gartner, the deceased individual would have been able to join in this symbolic procession, which carries on in perpetuity.

—MARLEY BROWN

CATAWBA MAP

DATE: ca. 1721

MATERIAL: Paper

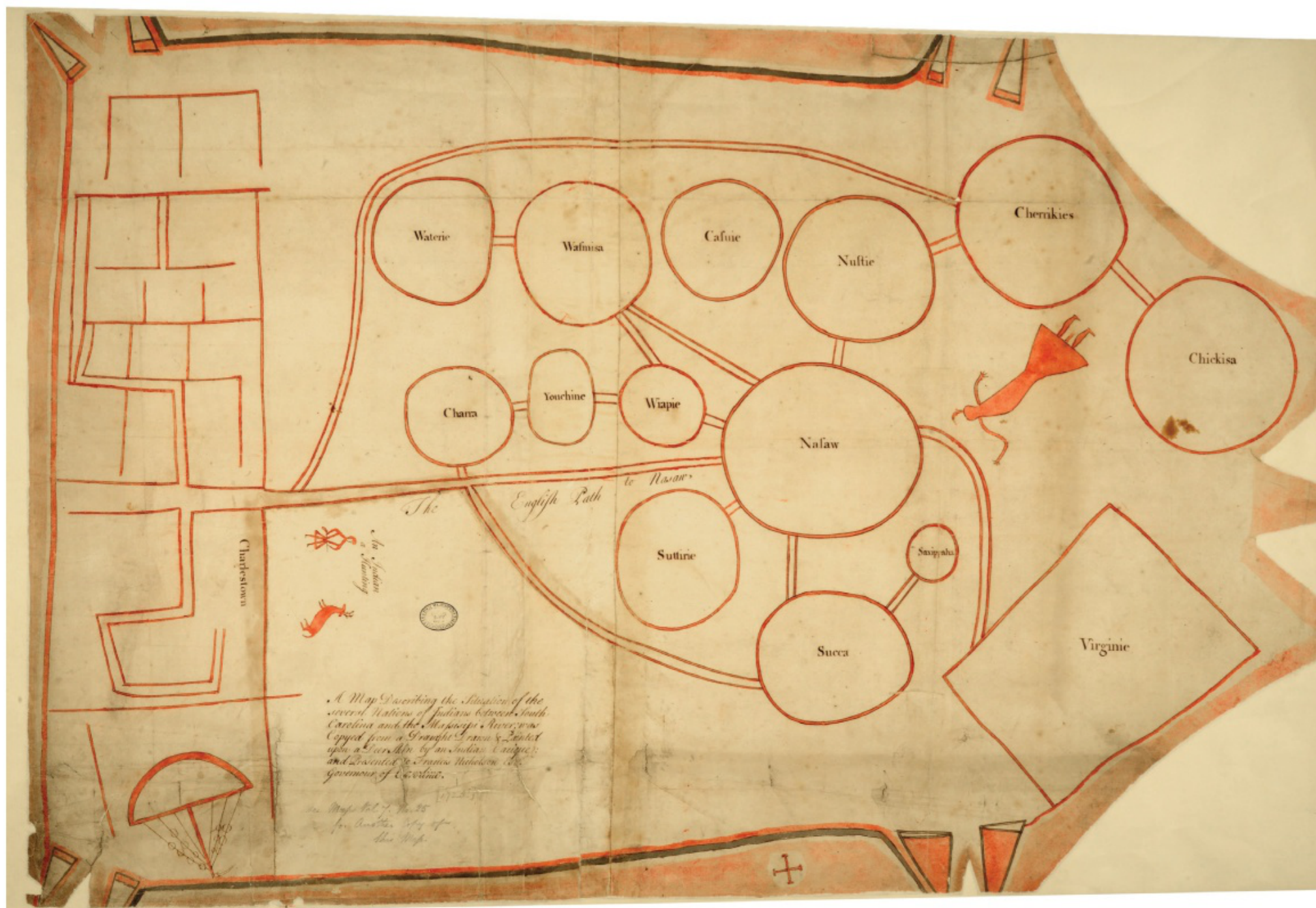
DIMENSIONS: 3.5 feet by
2.5 feet

FOUND: Charleston,
South Carolina

Soon after arriving in Charleston, Francis Nicholson, the newly installed royal governor of South Carolina, received a deerskin map thought to have been drawn by an Indian “cacique,” or chief. Nicholson ordered a paper copy of the map, which represents 13 native groups as circles connected with lines. It remains a rare example of indigenous North American cartography from the colonial period.

Archaeologist Gregory Waselkov of the University of South Alabama believes that the mapmaker was probably a member of the Catawba people—who still call South Carolina home—as the Catawba community of Nasaw occupies the central position. European settlements, including Charleston and Virginia, are portrayed by squares, which Waselkov thinks was not only a way of differentiating the English as foreigners, but may have constituted a native critique of European rigidity. The circles and squares vary in size, likely in proportion to the importance accorded the communities by the mapmaker. The connecting lines illustrate social and political relationships among people throughout the South Carolina Piedmont and the greater Southeast. “Archaeologists are often reluctant to make assumptions about peoples’ knowledge of their neighbors without the presence of artifacts,” Waselkov says. “But this map is further evidence that native people were aware of things far from their own hearths.”

—MARLEY BROWN





In 1885, an Inuit hunter named Kunit traded a trio of unusual wooden maps to Gustav Holm, the leader of a Danish expedition that was making its way up Greenland's east coast. The maps served as a guide to a stretch of coast north of Ammassalik, the small settlement where the transaction took place. Two of the maps, shown here, complement each other: One map, left, portrays the undulating coastline, with alternating fingers of land and fjords, and the other represents a string of offshore islands. The third depicts a peninsula.

The maps were not designed for practical navigational use, says archaeologist Hans Harmsen, a curator at the Greenland National Museum, but rather as story-telling aids. "You could show the person who was hearing the story the contours of the coast and the relationship between the islands and the coastline," he says. The map of the coast even includes a pronounced arcing groove indicating where a traveler would have to carry their kayak overland to get to the next fjord. There is no evidence that such wooden maps were commonly produced by the Greenland Inuit, as those Kunit made for Holm are the only ones of their kind known.

—DANIEL WEISS

WOODEN INUIT MAPS

DATE: 1885

MATERIAL: Wood

DIMENSIONS: 5.5 inches by 2 inches (left), 8.5 inches by 1 inch (right)

FOUND: Ammassalik, Greenland

MARSHALL ISLANDS STICK CHART

DATE: ca. late 19th to early
20th centuries

MATERIAL: Wood and
cowrie shell

DIMENSIONS: 2 feet by
1.8 feet

FOUND: Marshall Islands,
Micronesia

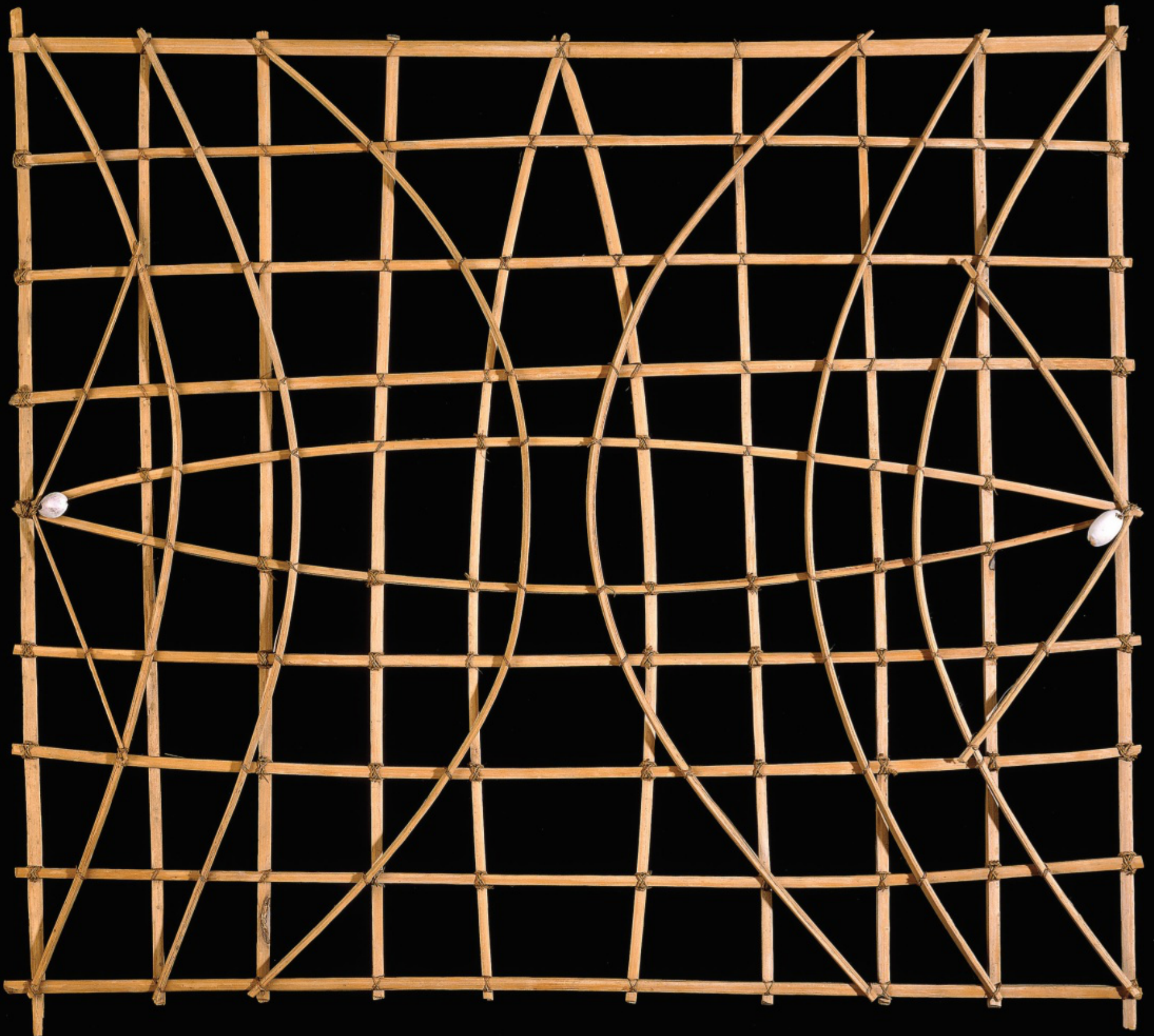
The education of a navigator in the Marshall Islands, a Micronesian archipelago in the South Pacific, traditionally began by being blindfolded in a canoe. Young sailors learned to feel and intuit the motion of the sea before ever venturing out on ocean journeys. The deep Marshallese connection with waves and their movements reaches back more than 2,000 years to land-finding techniques used by the islands' first settlers.

Scholars have identified two different types of Marshall Islands stick charts, wooden diagrams the Marshallese have been producing since at least the middle of the nineteenth century. The first and probably older type, shown here, contains abstract representations of how waves interact with bodies of land in general. The second type illustrates actual islands,

often represented by cowrie shells, along with swell patterns identified and recorded by pilots. "There aren't that many examples from across the Pacific of this kind of navigational knowledge being encoded or physically represented," says anthropologist Joseph Genz of the University of Hawaii. He says the charts were used mainly as teaching devices rather than real-time wayfinders. They help to impart perhaps the most

crucial concept in the Marshallese navigational tradition, that of the *dilep*, or "backbone wave." "People still describe the dilep as the most important wave to find," Genz says. "It's like a path you can follow to the next atoll. Instead of going landmark to landmark, you go seamark to seamark."

—MARLEY BROWN



China's Hidden City

Recent discoveries at an isolated northern settlement are challenging traditional narratives about the origins of Chinese civilization

by JASON URBANUS

IN NORTHERN CHINA'S Shaanxi Province, the Tuwei River winds its way through the undulating terrain of the Loess Plateau. This Yellow River tributary bisects a stark landscape. To the west are rows of rolling sand dunes that gradually taper off into the Mu Us Desert; to the east are rippling hills and mountain ridges cut

by steep gullies and ravines. Even today, this is considered a remote region of China. Scholars have long believed that thousands of years ago, it was not only remote, but also existed at the distant outskirts of the civilized world, far from the Central Plains, where many believe Chinese civilization originated 4,000 years ago.



A massive network of stone defensive walls, gates, towers, and ramparts still surrounds Shimao, China's largest known Late Neolithic site.

The region is perhaps best known for a section of the Great Wall that weaves through its landscape. Parts of that 13,000-mile barrier, first built around the third century B.C., pass close to an ancient place called Shimao. For many years, Shimao, which was known for its ruined stone walls and for the jade objects periodically unearthed there, was thought to be a neglected segment of the Great Wall itself. Since the 1950s, though, scholars have suspected that the site had a more significant history than as just a section of the famous fortification. Yet when archaeologists led by Zhouyong Sun of the Shaanxi Academy of Archaeology recently investigated the site, they were nonetheless bewildered to find that Shimao is actually an enormous ancient city that dates back to the Neolithic period, more than 4,300 years ago. No ancient text mentions the site or the people who lived there, but its ruins comprise the largest known settlement of the Chinese Late Neolithic era. “I think it’s actually the biggest story in Chinese archaeology in a long time,” says New York University archaeologist Roderick Campbell. “On the edge of the desert is not the first place you’d expect to find something of this size in this period.”

Shimao was once home to a complex and unique culture. Its inhabitants built monumental stone structures two and three stories high, acquired luxury goods across long-distance trade networks, and produced works of art including stone sculptures, painted murals, and fine ceramics. One of the biggest clues that something very old and significant lay hidden at Shimao was the sheer abundance of jade objects found at the site over the years. Jade artifacts are regularly unearthed at Late Neolithic sites in China, and experts have estimated that as many as 3,000 to 4,000 jade objects from Shimao may be in museums and private collections today, many of them possibly acquired through illegal activity. To protect the site from further damage and to determine what, exactly, Shimao was, Sun’s team began the first systematic surveys and excavations there in 2011. Initially, Sun was hard pressed to comprehend what the team was finding. “Nobody expected that a massive stone-walled city could appear in northern China, which is far away from the traditional cradle of early Chinese civilization,” he says. Now, his team’s discoveries are helping archaeologists and historians better understand the true story of early China—and perhaps the very origins of Chinese civilization.





THE THIRD MILLENNIUM B.C. in China was a period of profound change, especially in the central and northern regions. At that time, favorable climatic conditions spurred migration and increased contact among different settlements. This, together with the introduction of new technologies, led to the development of what archaeologists call “complex societies.” These Neolithic societies were controlled by small groups of elites who commanded both power and wealth and oversaw the growth of large, hierarchically organized centers. “Complex societies like Shimao developed during the Neolithic era in several locations,” says Stanford University archaeologist Li Liu. “In the Loess Plateau and areas adjacent to Shimao a few dozen fortified sites emerged, but Shimao was the largest one.”

Ceramic evidence indicates that Shimao was founded around 2300 B.C. Over the course of almost 500 years, it grew from a small settlement to encompass an area of almost 1,000 acres, at the heart of which stands a 230-foot hill. Although today it is partially covered by vegetation and buried in debris, thousands of years ago it would have appeared much different. As Sun’s team began removing several feet of topsoil, they revealed a series of huge stone terraces, at least 11 in total, which had once reshaped the natural hill into a stepped pyramid. Embedded in the terrace walls were ominous-looking sculptures depicting eyes, geometric shapes, and anthropomorphic figures. On the pyramid’s flat apex stand the remains of a fortified palace, once home to Shimao’s ruling families. Sun’s team was surprised by the palace’s stone, wood, and earth construction, which was far more sophisticated than what has been found elsewhere in China from this time. In addition to this royal residence, archaeologists have uncovered a wealth of artifacts across the site that suggest Shimao had a thriving artisan and industrial community. There is evidence of a bone workshop, where tools such as needles, awls, arrowheads, and spades, as well as decorative beads, were manufactured. Sun’s team even found rare evidence of early metalworking, including a stone mold for casting bronze knives.

Botanical remains and bones found at the site demonstrate that Shimao’s farmers were raising an unexpectedly diverse array of crops and domesticated animals.

Shimao was not only the largest Late Neolithic settlement in China, but also one of the largest known anywhere in the world from the time. Encircling it all was a massive defensive system, the outer walls of which may have once stood 20 feet high and featured a system of ramparts, guard towers, and bastions. All of these were built with stone, instead of the rammed-earth technique that was common everywhere else in China during the Late Neolithic. “Such a large-scale stone fortification and its complex structure had never been found before in China,” says Sun. The focal point of this defensive network was the heavily fortified eastern gate, which probably protected Shimao’s main entrance. Here, two massive 25-foot towers loomed over a 150-foot-long paved gateway whose walls were at least partially adorned with a patterned red, yellow, green, and black mural. Anyone entering the city had to follow this path, which snaked around barricades and passed a series of guardhouses.

During recent excavations, Sun’s team discovered that Shimao’s monumental stone structures were also the scene of a pair of recurring religious rituals, one of which involved human sacrifice. At least seven pits, containing more than 100 skulls, have been unearthed in locations adjacent to Shimao’s gates or beneath its floors and walls. Most of the skulls belonged to young women. Sun believes that the victims may have been sacrificed as part of a ceremony that accompanied the construction of a wall or the foundation of a building, either to appease the gods or to ward off evil spirits.

The second ritual involved placing jade objects such as spades or scepters between a wall’s stone blocks during its construction. While there is evidence for human sacrifice at other Chinese Neolithic sites, the ritual placement of jade objects is unique to the people of Shimao. “There are a few things going on at Shimao that are weird and wonderful,” says Campbell. “The jades in the wall are just bizarre. It’s a very strange practice.” Much like the human sacrifice and deposits of skulls,



A series of stone terraces resembling a stepped pyramid is carved into a large natural hill at Shimao’s center.

the placement of jade objects was likely meant to help repel evil spirits or even to enhance a wall's protective capabilities.

SHIMAO'S LATE NEOLITHIC DATE, the artifacts discovered there, and the cultural practices of its people seem to contradict many long-accepted theories about early China. That traditional narrative emphasizes that what scholars identify as Chinese civilization originally developed during the Bronze Age, around the mid-second millennium B.C., in an area of the Central Plains along the middle and lower Yellow River valleys. This was a period of technological innovation, especially bronze casting, the growth of centralized states, and the rise of advanced societies. The first two semilegendary Chinese dynasties, the Xia and the Shang, are thought to date to this era. Chinese scholars have long attempted to trace modern Chinese society back to this important time and place, thereby weaving a four-millennia-long continuous historical narrative.

However, thanks to evidence from sites such as Shimao, archaeologists now know that large advanced settlements existed in the north hundreds of years before their Central Plains successors. These peoples' contributions to both ancient and modern Chinese culture have until recently been overlooked. "The discovery of Shimao raises many questions about ancient Chinese cultures and poses a challenge to the traditional view of the development of Chinese civilizations," says Liu. "Archaeologists now tend to think there were multiple centers where early civilizations emerged."

The finds at Shimao also suggest its inhabitants may have played a pivotal role in introducing some of the technological advances that helped usher in the thriving era of the Chinese Bronze Age. Many of the innovations that define the cultures of the Central Plains Bronze Age are thought to have arrived in China from regions to the west at the end of the Neolithic, specifically from the Eurasian Steppe. These include bronze-working technology, crops such as wheat and barley, and domesticated sheep, goat, and cattle. All of these developments seem to have appeared in Shimao long before they did elsewhere in China. "Northern China played a crucial role in bridging the early civilizations in Eurasia and China," says Sun. The style of Shimao's stone sculptures, painted murals, and architectural remains show that its inhabitants were communicating with western Eurasian people across extensive trade networks. "Part of the Shimao story has to be the transference of all these really impactful things from western Eurasia into China during this period," says Campbell. "When China really becomes part of the Eurasian Bronze Age, it's through sites like Shimao."

AROUND 1800 B.C., Shimao went into sudden decline. There must have been widespread conflict in the region, given the effort the people of Shimao put into building defensive structures. But archaeologists have found no evidence that the settlement suffered a violent end. It is more likely, they say, that climatic shifts contributed to Shimao's eventual disappearance. Climatologists have hypothesized that a sudden cooling and drying of the environment affected much of northern and central China at this time. In Shimao, an area



A pit (top) containing decapitated skulls and two jade spades (above) embedded in a wall are evidence of religious rituals archaeologists believe were intended to protect Shimao's inhabitants and repel evil spirits.

that already existed on the border of agriculturally sustainable conditions, such a natural event would have been catastrophic. Campbell also wonders whether Shimao may have also simply outgrown itself. "If you already live in a marginal environment, you build a giant site, you provision it, and you cut down all the trees, very quickly that lush environment becomes incredibly eroded," he says. "If the climate is getting worse and you've messed up the local environment, it could just be the straw that breaks the camel's back." In the end, though, maybe it was also inevitable. As Campbell points out, 500 years is a long time, about as long as any major center in ancient China ever lasted.

With much of Shimao still to be explored, Sun believes that excavations there may last into the next few decades. In the future, researchers will hope to learn more about the settlement's layout, how densely populated it was, and, ultimately, who Shimao's people were, where they came from, and where they went. They will also try to assess how much Shimao's inhabitants may have influenced succeeding generations and cultures, especially those that rose a few hundred years later to the south at a time that has been considered the dawn of Chinese civilization. It is now clear that this remote highland region, long dismissed and overlooked, should no longer be considered peripheral to important developments in early Chinese history. Says Campbell, "No one realized just how important the north was until Shimao." ■

Jason Urbanus is a contributing editor at **ARCHAEOLOGY**.

INSIDE KING

A decade of research offers a new look at the burial of Egypt's most famous



The tomb's northern wall depicts 3 scenes of Tutankhamun's journey after death. Left to right: The god Osiris is embraced by Tut, whose *ka*, or spirit, stands behind him; the goddess Nut greets the young Tut; Tut and his vizier, Ay, participate in the "opening of the mouth ceremony," which restores life to the pharaoh.

IN ANCIENT EGYPT, the passage to the afterlife was an arduous one. Even at the end of the journey, the deceased could be turned away from the paradise of the Field of Reeds if their heart tipped the scales when weighed against a feather. Often elements of the transit were painted on tomb walls, a process that,

judging from the accomplished and detailed murals that have survived, would have consumed a great deal of time. Although the walls of the pharaoh Tutankhamun's tomb are decorated with familiar scenes of this path to paradise, new research is now telling a fresh story about the real-world turmoil caused by the sudden death of the young king.

TUT'S TOMB

pharaoh *by* JARRETT A. LOBELL



The pharaoh, who was first known as Tutankhaten (r. ca. 1336–1327 B.C.), was crowned at the tender age of eight or nine, but his reign was not to last long, and he died before he turned 20. Scholars debate the cause, or causes, of Tut's death, but all agree that it came suddenly. Tut's unexpected passing presented a challenge—his planned tomb in the Val-

ley of the Kings hadn't yet been completed. Work on that tomb (KV23) was abandoned, and one in the eastern section of the valley originally intended for someone else (KV62) was hastily made ready. Egyptologist Kent Weeks, who directs excavations in the valley, says that KV62 was probably originally meant for either Tut's predecessor, Smenkhkare (r. ca.



1336 B.C.), or his successor, Ay (r. ca. 1327–1323 B.C.).

By the standard of other royal tombs, Tut's is quite small, composed of four small rooms, only one of which is painted. Despite its size, however, the tomb was filled with everything the pharaoh would need for the afterlife, including furniture, chariots, wine, fresh food, clothing, shaving and writing equipment, musical instruments, games, and weapons. There were four gold shrines, one fitted inside the other, within which were nested quartzite, wooden, and golden sarcophagi. The innermost sarcophagus contained the pharaoh's mummy wearing a 24-pound solid gold mask. There is evidence that Tut's tomb was robbed twice in antiquity—once, says Weeks, only a short time after the entrance was sealed.

When British archaeologist Howard Carter excavated the tomb in 1922, however, most of the extraordinary grave goods were in place, and the tomb appeared relatively intact. With the exception of the sarcophagus containing the mummy, all the artifacts have been removed to the Egyptian Museum in Cairo. What remains are four painted walls depicting scenes of the pharaoh's transition to the afterlife, which, for Carter, were of far less importance than the golden artifacts.

IN 2009, AFTER NEARLY 100 years and millions of visitors, the Egyptian Ministry of Antiquities' concern for the state of Tut's tomb was mounting. They called upon the Getty Conservation Institute (GCI) to study the tomb, in particular the wall paintings, and to develop plans to safeguard it. "When we got there, we were surprised because the paintings' condition was actually very good," says GCI's Lori Wong. "The fact that the paintings are complete puts everything in perspective. We worked here for 10 years, whereas the lifespan of these paintings is 3,300 years."

What the team was very curious about was something that had worried Egyptologists for decades—the puzzling brown spots that speckle the paintings. "Our main concern was that whatever was making the spots was still alive, and that there was a continuing risk of them damaging the paintings," Wong says. The team conducted advanced microbiological analyses and compared current images of the tomb with those taken by photographer Harry Burton during Carter's excavation—reproduced at a scale of one to one with the actual paintings

using the original glass plate negatives. They concluded that the spots hadn't grown or changed at all in nearly a century. "Whatever originally made the spots, they're now dead," says Wong. "They are a byproduct of some metabolic process, perhaps occurring thousands of years ago, and they aren't going to grow anymore."

AS THE GCI TEAM continued to examine the paintings, they noticed other details that intrigued them. They documented flaking paint, especially on the wigs of the figures on the east wall, which they determined had been repaired shortly after the pigment was applied. The flaking was not, as many had thought, damage suffered since the 1920s. "There was something about the application of the paint that caused this," says Wong. "Maybe the artist got the recipe wrong." There were visible chisel marks from when the walls were prepared that would usually have been covered up. Some of the paintings were slightly tilted. On one wall, a layer of clay-based plaster that would normally have been applied in advance of painting was missing. There were also varying techniques noticeable on different walls, likely the work of different artists. One artist used incisions in the plaster to delineate figures, while another sketched figures in red with no incisions. The team also saw, still present on each wall, different grid systems the artists used to plan their work. A new version of the tomb's story began to emerge.

"It's possible that these indications of a certain crudeness when compared to other tombs in the Valleys of the Kings are a result of the unusual and unexpected circumstances of Tut's burial and the hurried nature of the preparation of the tomb," says Wong. "Also, you have this relatively small burial chamber that would have been chockablock with objects, and cramming them all in may have scratched the walls and knocked off some paint. Some touch-up might have been needed."

THERE MAY ALSO have been a political motivation for Tut's hasty burial, explains Weeks. "Tutankhamun's vizier, Ay, and Horemheb, an army commander under Tut, were both vying to be pharaoh," he says. "Ay wanted his coronation completed before Horemheb returned to Egypt from fighting the Hittites in the north." It's possible that the crooked paintings, differing techniques, chipped paint, and even the brown spots are a result of the rush to finish and seal up the tomb after the pharaoh's untimely death. No other tombs in the valley that had similar grave goods, and thus similar microbial environments, show evidence of the brown spots. Perhaps the paint had simply not had enough time to dry.

Although Tutankhamun's reign lasted for only about a decade, the spectacular artifacts that filled his tomb have made an immeasurable impact on the popular imagination. While the tomb's wall paintings may not be as celebrated as its artifacts, the newly documented evidence about them begins to tell the story of a young man's death in a way that magnificent golden chariots and masks cannot. ■

Jarrett A. Lobell is editor in chief at *ARCHAEOLOGY*.



The eastern wall (top) shows high-ranking Egyptian officials pulling Tut's mummy across the ground to his tomb. The western wall (above) depicts 12 baboons representing the 12 nighttime hours Tut must pass through before reaching the afterlife.

MEDIEVAL ENGLAND'S POWER MONASTERY

For nearly 1,000 years, monks on the Holy Island of Lindisfarne wielded unprecedented political and economic might

by DANIEL WEISS

STANDING BY A TRENCH at the south end of the tidal island of Lindisfarne off the northeast coast of England, archaeologist David Petts gestures dismissively at the seemingly expansive ruins of a priory dating to the twelfth and thirteenth centuries that loom in the background. “Don’t be deceived by the little tiny priory we’ve got here. That’s quite compact. It’s like a pocket monastery,” he says. “The early monastery probably underlies the whole village. It was a big, big site, and there would have been buildings, including multiple churches, all over the place.”

The early monastery to which Petts refers dates to the seventh century, a time when Great Britain was occupied by competing Anglo-Saxon and Celtic kingdoms that regularly clashed in bloody battles and fought to hold on to territory. The monastery on Lindisfarne was established in 635 by Northumbria, one of the mightiest of the Anglo-Saxon kingdoms, and the two institutions maintained a powerful symbiotic relationship. Because of properties given to it by the kingdom, the monastery became one of the largest landholders in all of Britain, and, in return, the monastery lent Northumbria a modicum of stability. Pilgrims flocked to Lindisfarne, drawn by the cult of Saint Cuthbert, one of its early bishops, who was renowned for his extreme piety and performance of miracles. Beginning in the late eighth century, the isolated monastery’s wealth and popularity made it the target of repeated attacks by the Vikings. “When we think of the Lindisfarne monastery, we have to get rid of this idea of a clutch of monks staring off into the distance communing with puffins,” says Petts. “This is a big, powerful corporation, and its leaders were important political players.”

Despite the possible extent of the early monastery, archaeologists had until recently uncovered almost no evidence of its buildings. In large part, this is because so little excavation



The modern village and the ruins of a 12th- and 13th-century priory on the Holy Island of Lindisfarne surround a site where archaeologists are searching for the remains of a 7th-century monastery.



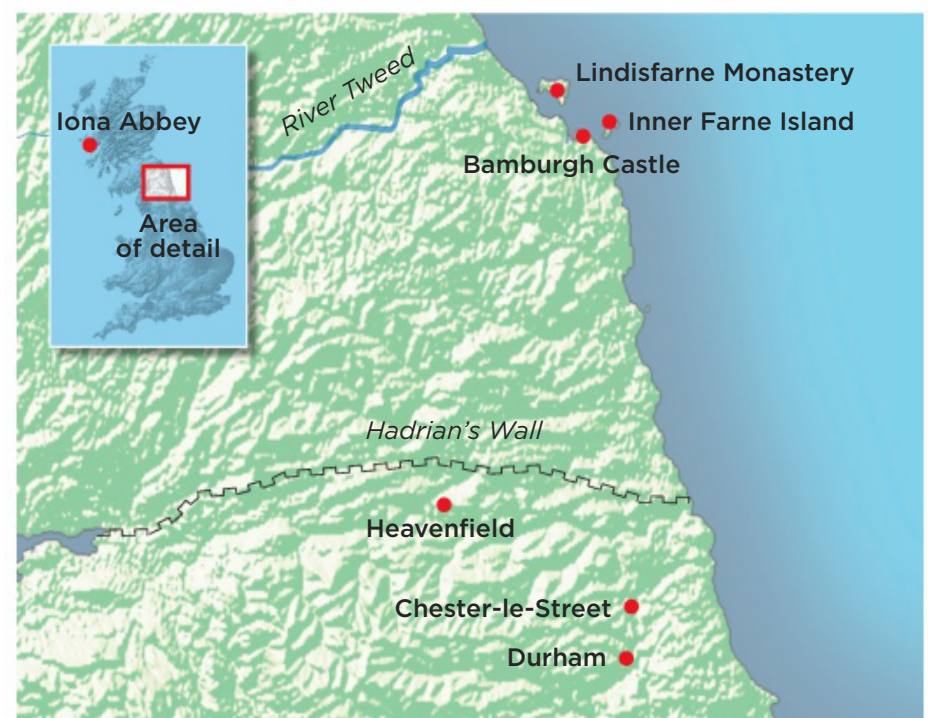


The foundations of a building thought to have been a church dating to between the 7th and 10th centuries have been unearthed atop the Heugh, a small ridge at Lindisfarne's southern edge.

had been carried out on the island, and because much of the monastery is thought to lie beneath modern-day houses and, as Petts points out, the later priory's ruins. But now, two teams—one of them led by Durham University's Petts—are investigating what appear to be promising swaths of land on Lindisfarne. In discovering evidence of churches, food remains, and grave markers, they are gaining insights into how the monks and their visitors worshipped, lived, and died on the island.

WHEN ÆTHELFRIITH IDING, king of Northumbria, was killed in 616 or 617, his son Oswald, then aged 12, fled with his mother and siblings to the protection of the Celtic kingdom of Dalriada in what is now western Scotland. Oswald's uncle Edwin, at the time a non-Christian who was allied with Æthelfrith's enemies, ruled Northumbria until his death in 632 at the hands of a rival king. In the meantime, Oswald was educated and converted to Christianity at a monastery on the island of Iona, off the west coast of Scotland (see "Scotland's Holy Island," page 45). After nearly two decades in exile, Oswald returned in 634 to claim the Northumbrian throne. The night before a decisive clash at Heavenfield, near Hadrian's Wall, Oswald reportedly had a vision of Columba, the Irish monk who had founded the monastery on Iona, who assured him of martial success and a happy reign. Upon hearing of the visitation, Oswald's Northumbrian followers pledged to become Christians after the battle. The next year, in one of his first significant acts as king, Oswald established the monastery on Lindisfarne and installed an Ionan monk named Aidan as its leader.

Just three decades after its founding, the monastery was swept up in a religious controversy with decidedly political overtones. Oswald had been killed in battle eight years into his reign. He was succeeded by his brother Oswiu, who had also been educated on Iona and followed the teachings of the Irish strain of Christianity that held sway there. Oswiu's wife, however, came from Kent, in southeastern England, and adhered to a branch of Christianity that traced its lineage directly to Rome. The Irish and Roman traditions differed on various points, ranging from the timing of Easter to the style of monks' haircuts. "You have a situation where the king is feasting while his queen and her ladies are still fasting for Easter, which is not good for domestic harmony," says Petts.



For Oswiu, though, broader considerations were also undoubtedly in play. At the Synod of Whitby, a church council held in 664, he decreed that Northumbria would turn away from Irish Christianity and embrace the Roman strain, which was growing increasingly dominant in Britain. Having lost the theological skirmish, the Lindisfarne bishop, named Colman, decamped for Iona along with a number of his monks and Aidan's relics. Later that year, Cuthbert was installed as prior. The newcomer was a brilliant administrator who reportedly rebuilt the monastery's ranks after the transition to Roman Christianity and added guesthouses and new churches to match its growing ambitions. He was also a revered holy man who tirelessly ministered to the common people of Northumbria and is credited with a series of miracles, including changing the wind's direction to allow threatened ships to come safely to land and drawing water from dry earth.

Cuthbert was, however, a man torn. His reputation drew large numbers of pilgrims to the island, but he longed for solitary contemplation. In 676, he retired to a hut on Inner Farne, an island several miles south of Lindisfarne populated only by seals and seabirds. This brought Cuthbert within clear view of the Northumbrian royal fortress at Bamburgh (see "Stronghold of the Kings in the North," archaeology.org/bamburgh), from where Oswiu's son Ecgfrith now reigned. Ecgfrith was an aggressively militaristic leader with whom Cuthbert occasionally clashed. "Cuthbert is camping as a hermit outside the king's bedroom window, signaling to him and his court that Christianity is serious stuff," says Michelle Brown, professor emerita at the University of London. While Ecgfrith apparently did not heed Cuthbert's message—the king died in 685 during a rash, preemptive attack on the Picts, a group of tribes native to the far north and east of Scotland—he recognized the holy man's allure. In the months before he died, Ecgfrith convinced a reluctant Cuthbert to become Lindisfarne's bishop.

Cuthbert remained in this role for only a year or two before returning to live out his final days on Inner Farne. Even then, though, he couldn't escape the concerns of the wider world. "His brothers come to visit him during his last illness on the island, and they say to him, 'When you die, we're going to have to take your body back to Lindisfarne. We need you to be a visible symbol after death,'" says Brown. "All Cuthbert wants is to be buried on his little island, and he warns them to beware of inviting the world in to too great an extent." Despite his wishes, Cuthbert's body was interred next to the high altar of Lindisfarne's main church. As the monks had predicted, Cuthbert's renown—and the crowds attracted to the island by it—only grew after his death. In 698, 11 years after Cuthbert had died, the monks dug up his grave and discovered, to their surprise and delight, that his vestments and shrouds looked new,

Scotland's Holy Island

In 563, an Irish monk named Columba came to the island of Iona, off the west coast of Scotland, along with a group of followers—12, according to legend—and founded a monastery that grew into one of the most important religious sites in the British Isles. King Oswald of Northumbria, among others, was educated there, and when he established the monastery on Lindisfarne in 635 he envisioned it as an "Iona of the East."

Unlike Lindisfarne, which has, until now, been very little excavated, Iona has been explored by archaeologists periodically for more than five decades. During these excavations, teams have unearthed evidence of wooden structures dating to the monastery's earliest years. Perhaps the most intriguing of these discoveries is a hut that, according to a biography written a century after his death, Columba used as a writing cell. Archaeologist Charles Thomas originally recovered the burned remains of the wattle hut, which stood on a rocky outcrop known as Tórr an Abba, or "Mound of the Abbot," during excavations he carried out from 1956 to 1963. But Thomas never published his results, and currently a team led by Adrián Maldonado of National Museums Scotland is reinvestigating



his findings. When Maldonado radiocarbon dated charcoal from the hut, he determined that it dated to the sixth century. "If it wasn't, in fact, Columba's writing cell," says Maldonado, "it was certainly a hut in a prominent location overlooking what we know to have been the early church." Maldonado's team has excavated a number of deposits dating to the sixth century, but little evidence for other early wooden structures has been found. One exception is a large, round timber building first uncovered in the 1970s that appears to date to the seventh or eighth century. "It could be a workshop, or maybe a guesthouse," says Maldonado.

Beginning in the late seventh century, excavations show, Iona's monks began to shift from wood to stone as their favored construction material. A stone wall originally unearthed by Thomas, and further excavated by Maldonado's team, was once part of a large building that radiocarbon dating of metalworking debris abutting the wall indicates was in use by the seventh or eighth century at the latest. "Monasteries like Iona were becoming popular pilgrimage locations," says Maldonado. "By the end of the eighth century, churches were being rebuilt in stone to make them more permanent, more impressive, and to allow them to cater to larger numbers."—DW

his body appeared undecayed, and, according to an anonymous biographer, his head had “kept all the beauty of its first whiteness.” Cuthbert was transferred to a carved wooden coffin that was kept on display above the church floor. “A whole massive cult then begins to develop around Lindisfarne, on the back of Cuthbert,” says Newcastle University archaeologist Colm O’Brien. “By the time we’re coming into the eighth century, Lindisfarne is on the up on the strength of Saint Cuthbert.”

At this time, the monastery was growing extremely wealthy. Oswald had deeded to it a stretch of territory on the mainland known as Islandshire to help it support itself. Over time, other kings bequeathed more and more land, frequently in thanks for military victories. An eleventh-century text titled *Historia de Sancto Cuthberto* provides an accounting of the acreage gifted to the monastery—as well as that taken back by later monarchs who felt it had grown too powerful. “There is a famous passage that says, ‘These are the boundaries of Lindisfarne’s territory,’” explains O’Brien. “It describes a huge block of land, on both sides of the River Tweed, in what is now Scotland and England, as part of Lindisfarne’s estate.”

Bede, the great eighth-century British historian, explains land donations made to Lindisfarne and other monasteries as expressions of piety, but O’Brien suggests they had strong earthly motivations, too. Early medieval kings were really warlords, ruling over whatever territory they could hold down, he explains. This led to instability, as every time a king died, all his land was up for grabs. Land given to a monastery, however, stayed with the monastery. “Christianity brought the idea of institutional stability,” he says. “Even when a particular bishop or abbot died, the institution carried on.” Much of the land given to monasteries was located in the respective kingdoms’ outer reaches. “They’re giving lands on the edges of their territories and enabling these rather smart institutions, which have educated, skilled people, to develop it,” O’Brien says. “So the monasteries become an agency of economic development.” The names of towns that are in lands once held by the Lindisfarne monastery testify to this day to their economic specialization: Cheswick produced cheese, Goswick raised geese, and Buckton bred deer.

BEDE WRITES THAT, in the 650s, when Finan, Lindisfarne’s second bishop, erected a new church on the island “suitable for an episcopal see,” he built it “after the Irish method, not of stone, but of hewn oak, thatching it with reeds.” The first buildings comprising the monastery are also believed to have been constructed of timber. Although no evidence of these early wood structures on Lindisfarne has yet been found, current excavations there have uncovered

evidence of a number of stone structures thought to date to between the seventh and tenth centuries.

On the Heugh, a small ridge on the island’s southern edge, a team led by Richard Carlton of the Archaeological Practice for the Peregrini Lindisfarne Landscape Partnership has unearthed the foundations of two buildings that appear to have been churches. One was constructed of large sandstone blocks and consisted of two rooms, while the other was made mostly of unfinished stone blocks. Given these different construction styles, Carlton believes the two buildings were likely not built contemporaneously, though he is unsure which is older. In addition to Carlton’s discoveries, traces of two other early stone churches have previously been identified on Lindisfarne. One of these is at the site of the current parish church, St. Mary’s, where a standing wall is thought by scholars to date in part to before the 1066 Norman Conquest. The other is at the site of the twelfth-century priory church, where the footings of a preconquest wall were unearthed during rubble clearing in the late nineteenth and early twentieth centuries. Petts believes this wall likely belonged to the monastery’s main house of worship, where Cuthbert’s relics were displayed.

This skeleton (below), likely male, was excavated in an 8th- to 10th-century cemetery on Lindisfarne thought to have been used by laypeople. A quartz pebble (bottom) is one of thousands placed on burials as commemorative items.



An 8th-century name stone that marked the burial of a woman named YPFRID ("Ytfrith") was found at the laypeople's cemetery on Lindisfarne.

Building churches on the Heugh would have been a way for the monks to express the connection between the monastery and Northumbrian royalty. "There's a direct line of sight between the top of the Heugh where we've found the two churches and Bamburgh Castle," says Carlton. "The monks were essentially forming a link between their political patron and the ecclesiastical establishment." The Heugh may also have been where monks on Lindisfarne stood watch, as Bede relates, for a fire lit on Inner Farne indicating that Cuthbert had died.

THE OTHER ARCHAEOLOGICAL team that has been working on Lindisfarne, led by Petts under the auspices of DigVentures, a crowdfunded organization, has focused on an area below the Heugh and just to the east of the twelfth- and thirteenth-century priory ruins. There they have found a cemetery with five intact skeletons and the mixed remains of at least 10 other individuals disturbed by later plowing. Radiocarbon dating of the mixed remains shows they are from the eighth to tenth centuries. "The cemetery we've got was clearly not used by the monks," Petts says, noting that it includes women and very young children. "It was used by people on the island or, perhaps, people coming from elsewhere in Northumbria to visit the site." In addition to thousands of small quartz pebbles left on graves in commemoration, the team has unearthed three eighth-century Anglo-Saxon name stones that served as grave markers. One of these marked the burial of a woman named YPFRID ("Ytfrith"). The team has also turned up another type of eighth- or ninth-century grave marker, a cross stone, whose style is similar to others found in the area of western Scotland where Iona is located. "We know from the contemporary documentary record that there were continued links between Iona and Lindisfarne after the Synod of Whitby," says Petts. "This stone is exciting because it's the first time we've found archaeological evidence that bears this out."

In addition to this new evidence of ecclesiastical practice, Petts' team has begun to learn a bit about daily life on the island, including what was eaten there. "We've got sheep, pig, and cow bones, and we're also getting things like seal, oyster shells, and whelks," says Petts. "They're really making the most of having the sea literally at their doorstep." Further analysis of the animal bones may help establish whether they were from livestock raised on the island or from the mainland territory held by the monastery. The team has also unearthed the stone footings of a building that appears to date to the eighth or ninth century, including a kiln or perhaps an oven that Petts believes could have been used to prepare food for the large number of people living

on and visiting the island. "A monastery like Lindisfarne probably had among the biggest permanent populations in the Anglo-Saxon world," he says. "In order to feed all these people, there would have been lots of kitchens and workshops with lots of people working in them."

THROUGHOUT THE EIGHTH century, the Lindisfarne monastery continued to grow increasingly wealthy, and numerous members of the Northumbrian nobility opted to join its orders, though they did not always take to the rigors of monastic life. The monks had traditionally been allowed to drink only milk and water, but Ceol-

wulf, a Northumbrian king who abdicated his throne in 737 to become a monk, obtained a special dispensation allowing them to drink beer and wine.

In 793, Lindisfarne became the first monastery in the British Isles to be attacked by the Vikings. In addition to the monastery's riches, the marauders were likely attracted by the large number of people on the island, whom they may have abducted and sold into slavery. The Northumbrian scholar Alcuin of York famously described the devastation wrought by the Vikings: "Behold, the church of Saint Cuthbert spattered with the blood of the priests of God, despoiled of all its ornaments; a place more venerable than all in Britain is given as prey to pagan peoples." However, no archaeological evidence of the attack has been identified. "It's quite hard to know what to look for," says Petts. "We might find burning, but places with thatch roofs, wooden buildings, and open fires burn down quite a lot anyway. It's a violent world as well, so even finding bodies with blade injuries would not be a smoking gun."

The Vikings returned to attack the monastery again and again, for almost a century. Around 875 Lindisfarne's leaders fled to the mainland, taking with them Cuthbert's relics and other valuables, including the Lindisfarne Gospels, a richly illustrated edition of the holy text dating to the early eighth century (see "The Gospels of Harmony," page 48). After at least a century of wandering, the Lindisfarne community settled in Durham, some 75 miles to the south. A portion of the community returned to Lindisfarne in the twelfth century and built the priory whose ruins are now visible on the island. Scholars once thought that the monastery had been completely abandoned from the late ninth through the twelfth centuries, but Petts argues that archaeological evidence makes it clear that this is oversimplistic. He points out that much of the sculptural work that has been excavated on the island dates to this period of supposed abandonment. "It's pretty clear there continues to be some kind of ecclesiastical presence on the island," he says. "The sculpture is quite theologically complex, so there must have been people making it, commis-

The Gospels of Harmony



The carpet page preceding the Gospel of Matthew incorporates a Latin cross.

The Lindisfarne Gospels is among the most finely crafted early medieval illuminated manuscripts to have survived to the present day. Remarkably, it is believed to have been produced by a single individual: Eadfrith, the bishop of Lindisfarne from around 698 to 722. According to Michelle Brown, professor emerita at the University of London and former curator of illuminated manuscripts at the British Library, at the time it would have required a rotating team of scribes to produce a typical plain-text book. “Whereas this, one of the most elaborate books ever made,” she says, “is pretty much entirely the work of one very gifted artist-scribe.”

branches of Christianity from around the world. “Its message is one of reconciliation, harmony, and burying of differences,” says Brown. The book’s illuminations incorporate a broad range of decorative techniques and styles, including Celtic spiral work, Pictish animal ornament, Anglo-Saxon Germanic animal interlace, and Greek letter forms. The manuscript is thought to have been prominently displayed alongside Cuthbert’s relics on the altar of the main church at Lindisfarne, which became one of the most-visited holy places in Britain. Pilgrims from disparate origins were all able to see something of their own culture reflected in its motifs.

Eadfrith brought exacting standards and novel methods to the task. To produce the vellum for the book’s pages, he selected skins from some 150 of the finest yearling cattle, most likely drawn from a much larger pool to ensure they were as flawless as possible. The bishop devised ways to create the nearly 100 different colors that appear in the manuscript using just six locally available plants and minerals, including a type of lichen that yielded 40 shades of purple, and the plant woad with crystals of hoof and horn gum suspended in it, which mimicked the exotic gold-speckled blue of lapis lazuli. To craft the book’s intricate illuminations, Brown says, Eadfrith invented the lead pencil, as well as a method of drawing on the backs of pages and painting on the front that anticipates the modern light-box technique.

The manuscript was not, however, just an exercise in artistic and technological virtuosity. Eadfrith is believed to have worked on the book from around 715 until his death in 722. At this time, a number of schisms within Christianity had recently been resolved, including the Iona monastery’s shift from the Irish strain of the faith to the Roman one observed at Lindisfarne and in most of the rest of Britain. The work blended, in a single volume, the artistic and religious styles of the many cultures of the British Isles, as well as those of different



The page containing the opening lines of the Gospel of Matthew combines Germanic animal interlace and Celtic spiral work, Roman capitals, stylized Germanic runic forms, and Greek letters.

This message of concord is perhaps most concisely expressed in the carpet pages that precede each of the four Gospels. These densely illustrated folios are modeled after prayer rugs, and thus provide a symbolic entry to the holy text. Each incorporates the design of a different style of cross: Latin, Greek, Celtic, and Coptic/Ethiopic. “Each gospel gives its own version of the story,” says Brown. “The four different crosses represent the different church traditions of the East and the West and show that the traditions have their differences, but they’re all essentially the same.”

When the leadership of the Lindisfarne monastery fled the island around 875, they took the Lindisfarne Gospels with them to the mainland. Decades later, around 950 or 960, when the community was temporarily settled in the town of Chester-le-Street, some 65 miles south of Lindisfarne, a scribe named Aldred wrote an Old English gloss of the manuscript’s text between the lines of the original Latin, the oldest known translation of the Gospels into English. “This situates the English language in the tradition of the sacred languages of Hebrew, Greek, and Latin,” says Brown. “I think this sums up what the book is about.”—DW



Archaeologists unearthed the foundations of a wall at the edge of the medieval priory’s ruins. The original wall was likely part of an infirmary the monks tore down to make the island easier to defend against Scottish attacks.

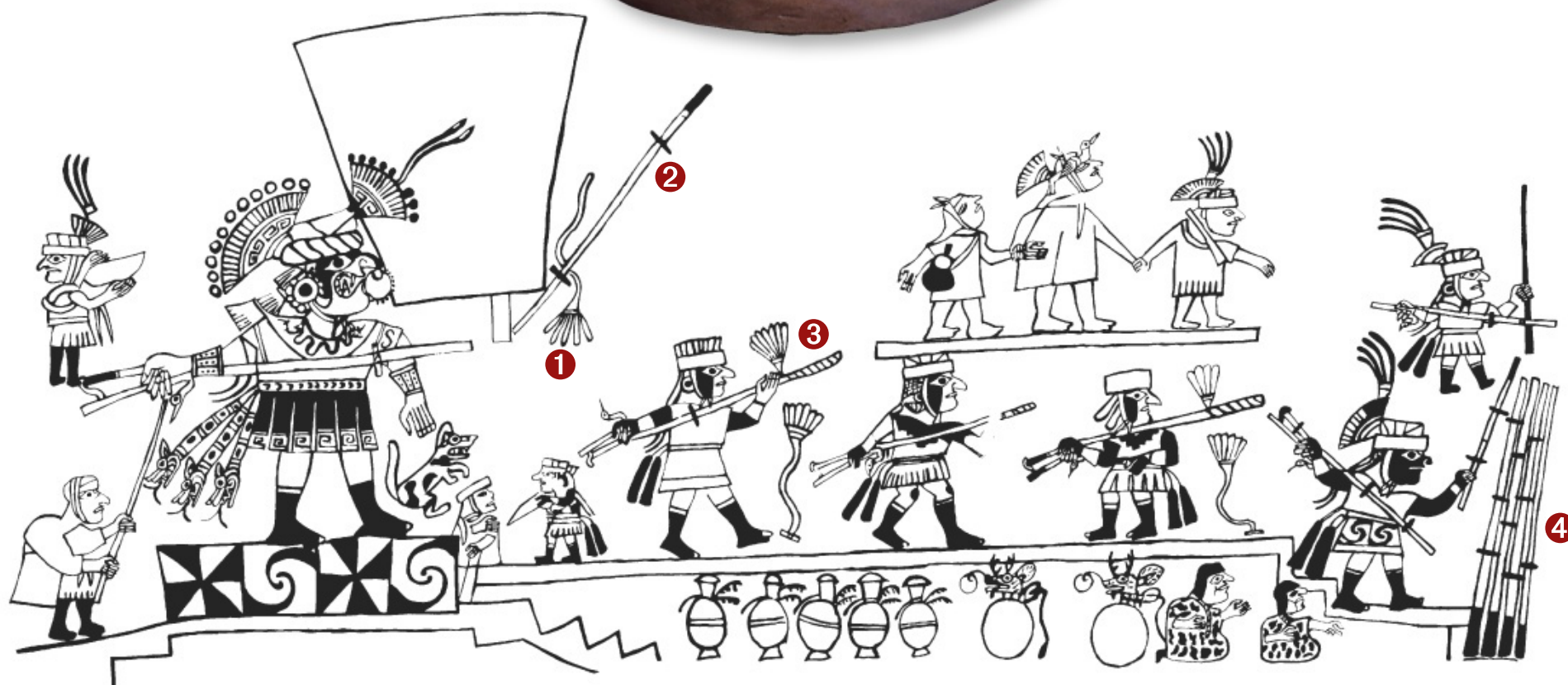
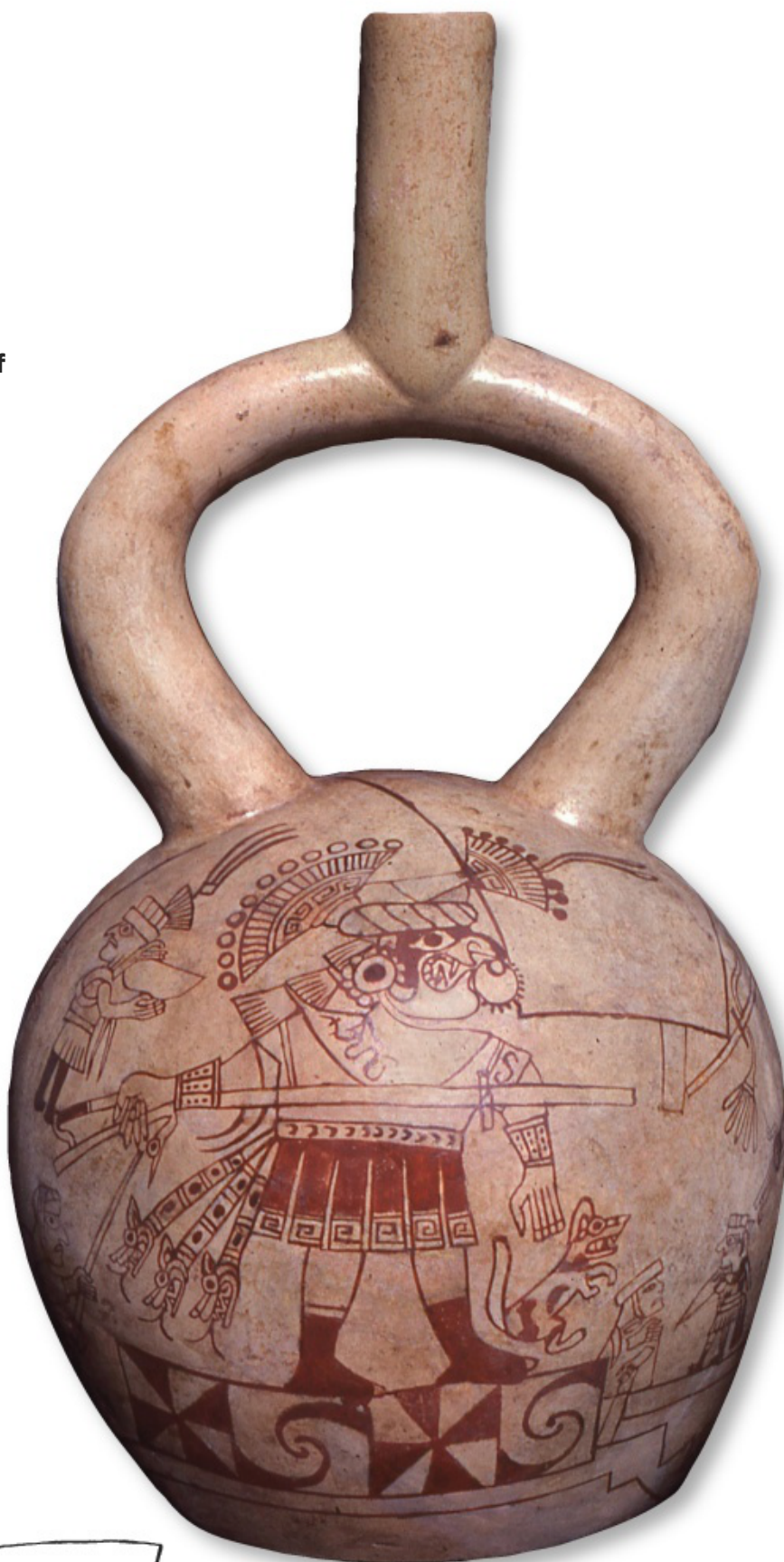
sioning it, and understanding the theological niceties to design it.” For example, a cross shaft dating to the late ninth or tenth century is thought to depict the appearance of Jesus Christ on the Day of Judgment. In addition, remarks Petts, the Vikings continued to attack Lindisfarne. “You don’t attack an island with just a couple of shepherds on it,” he says. “You come and attack a monastery.”

Even after the threat of Viking attacks had faded, Lindisfarne was targeted when war flared up between England and Scotland in the thirteenth and fourteenth centuries. Petts’ team has uncovered what appears to be evidence of how the monks survived. In a trench abutting a section of the priory ruins, they excavated the foundation of a wall that Petts believes was once part of an infirmary cloister sticking out toward the open ocean. “The monks are forced to make the priory a defensive unit, and I think they decide that this cloister makes it too hard to defend,” he says. As part of a retrenchment project, he adds, it appears they tore down the cloister and fortified the new outward-facing wall with a turret. “They threw up a big, windowless, faceless wall to defend themselves,” he says. “It’s a wall which says, ‘Go away!’”

Despite the best efforts of the Vikings and the Scots, the Lindisfarne monastery survived until the early sixteenth century, when it was seized by the state as part of King Henry VIII’s dissolution of the monasteries. Henry, who had broken with the Catholic Church over the pope’s refusal to grant him a divorce from his first wife, founded the Church of England as the new state religion. He presented the closing of the institutions as a consequence of this theological shift. However, like the Vikings before him, Henry was drawn by the monastery’s great riches. “Everyone talks about the Viking attack on Lindisfarne,” says Petts, “but the monastery keeps going long after the Vikings have gone. At the end of the day, it’s the monastery that endures.” ■

Daniel Weiss is senior editor at *ARCHAEOLOGY*.

A Moche ceramic jar (right) depicts an elaborately costumed man participating in a ritual spear-throwing game called “ceremonial badminton.” The goal of the game was to ensnare a feathered object resembling a shuttlecock with a crosspiece attached to a spear. A rendering (below) of the paintings on the entire jar shows elements of the game including **1)** a feathered object; **2)** a spear with crosspieces in flight; **3)** a feathered object wrapped around a spear with string; **4)** a stack of spears.



BRINGING BACK MOCHE BADMINTON

How reviving an ancient ritual game gave an archaeologist new insight into the lives of ancient Peruvians

by LIZZIE WADE

WHEN CHRISTOPHER Donnan began studying the art created by Peru's Moche culture more than 50 years ago, he wasn't sure how much it reflected ancient reality. From about A.D. 200 to 850, the Moche lived in the arid valleys of Peru's northern coast, where they practiced intensive irrigation agriculture and built vast ceremonial complexes. Moche artists created murals and decorated pottery with vivid images of fantastic rituals featuring participants who were part animal and part human. They also painted scenes of figures, some wearing elaborate clothing that indicated their elite status, engaged in a mysterious spear-throwing activity scholars dubbed "ceremonial badminton" due to the use of a feathered object that looks somewhat like a shuttlecock.

Early in his career, Donnan wondered whether the images might depict mythical figures operating on a supernatural plane rather than real people enacting ceremonies on Earth. The rituals certainly seemed to stretch the limits of reality. Chief among them was the sacrifice ceremony, in which attendants slit prisoners' throats and collected their blood in goblets, which were then presented to the presiding priest. The beings participating in the sacrifice ceremony took human form, but had body parts such as fangs, jaguar heads, and bird beaks. There were also depictions of ceremonial badminton contests that showed groups of figures armed with a type of spear-thrower called an *atlatl*, which is essentially a stick with a handle on one end and a hook or socket that attaches to a spear on the other. Participants seemed to use their *atlatls* to hurl spears with feathered objects attached to them. Like the sacrifice ceremony, ceremonial badminton could have been an actual event or a supernatural contest that occurred largely in

the Moche mythological realm. "When I looked at these rituals I often wondered if the activities were real. Did they really do that?" says Donnan.

Now, building on decades of archaeological discoveries and his own extensive experience analyzing depictions of Moche rituals, Donnan, an archaeologist at the University of California, Los Angeles, has re-created ceremonial badminton. In bringing to life a contest that for more than 1,000 years was confined to painted scenes on ancient pottery, he has been able to get a glimpse into the lived experience of the Moche that artifacts rarely afford.

THE QUESTION OF WHETHER or not Moche art depicts real events was settled in 1987, when Peruvian archaeologist Walter Alva excavated the tomb of a Moche nobleman now known as the Lord of Sipan. This nobleman had been buried in northern Peru's Lambayeque Valley along with the bodies of six attendants. The lord wore an elaborate costume that closely resembled the artistic representations of the sacrifice ceremony's participants. In a nearby tomb, archaeologists discovered the burial of a man who wore a large owl headdress that mimicked how a figure known as the Bird Priest appears in Moche art. Alva and his team even found goblets that had once held the victims' blood. "That really changed everything," recalls Donnan, who analyzed Alva's discoveries and confirmed their parallels to the art he knew so well. "This made clear that what you see in Moche art is real."

As archaeologists uncovered more and more evidence for these sacrifices, including the dismembered bodies of victims at a site called Huacas de Moche, or "Pyramids at Moche"—as well as the ceremonial use of hallucinogenic drugs, as evidenced by images of a local cactus that contains mescaline—



the reputation of this ancient culture that Donnan so loved began to harden in ways he found disturbing. “It isn’t as though this was everything the Moche did,” he says, “but when they are portrayed, it’s sex, drugs, and violence.” Still, since he knew that the art accurately depicted the Moche sacrifice ceremony, Donnan had to concede the event was probably a serious and brutal affair.

Donnan went on to excavate other Moche tombs, including one at the site of San Jose de Moro that held the body of a priestess whose garb matched that of a female participant sometimes depicted in the sacrifice ceremony. He unearthed another tomb at Dos Cabezas, or “Two Heads,” that was filled with prestige goods such as gold and silver nose ornaments, decorated ceramics, and a naturalistic burial mask made of copper and shell. Throughout his career Donnan remained fascinated by Moche art, and he found himself increasingly interested in the depictions of ceremonial badminton.

In these scenes, the activity’s basic form seemed clear. One person used an atlatl to toss a spear with the feathered “shuttlecock” tied to it into the air. The feathered object seemed to unwind from the spear in mid-flight and float toward the ground. Several other people stood

nearby at the ready holding atlatls and spears outfitted with crosspieces—generally two pieces of wood in the form of an X attached to a spear shaft. The goal of the ritual appeared to be to toss the spears with crosspieces at the feathered object, trying to snare it before it reached the ground.

Donnan easily recognized the game in Moche art, but he found it difficult to picture anyone actually playing it. The mechanics seemed a bit questionable: Would the string attaching the feathered object to the first tossed spear really unspool perfectly in midair? Wouldn’t it be impossibly hard to catch the shuttlecock on its way down? But given everything he had learned about Moche art faithfully depicting the sacrifice ceremony, he reasoned that ceremonial badminton must have also once been a feature of Moche religious life. One day in 2014, after decades of studying drawings of the ritual, Donnan decided to finally give Moche badminton a try. He and a friend fashioned makeshift spears and atlatls out of PVC pipe. They attached a small, light piece of wood with feathers tied to it to one of the spears with a string. They then tossed the spear into the air. “This was really a lark,” Donnan says. Yet even with their makeshift equipment, standing in the street outside Donnan’s Los Angeles home, it worked perfectly. “The string unwound in the air exactly the way it’s depicted, and the feathered object floated down slowly,” he says. “It was uncanny.” Aware that he was just a beginner at spear-throwing, Donnan wondered how much more could be learned about the ritual if it were performed by people who actually knew how to use atlatls.

After doing some research, Donnan found that there were many groups of atlatl enthusiasts, mostly in the United States and Europe, who fashioned their own atlatls, practiced throwing spears with them, and even held competitions. He decided to contact Chris Henry, an artist and experimental archaeologist, to propose the idea of re-creating ceremonial badminton. “I thought, ‘He will read this email and just think I’m a quack,’” Donnan says. But within 10 minutes, Henry had written back and was eager to get started.

Henry, who runs a company called Paleoarts that specializes in creating functional replicas of prehistoric tools, has had a lifelong fascination with ancient technology—and he particularly loves the atlatl. Henry notes that a simple



This ceramic vessel depicts a person wearing a feline mask in the act of slitting a captive’s throat. It probably represents a moment during a Moche sacrifice ceremony.

flick of an atlatl can propel a spear with 200 times more force than the human arm can muster, and with much greater accuracy. “It’s the great unsung invention of humankind,” he says. Paleolithic stone points that seem to belong to spears hurled by atlatls have been found in Africa and suggest the spear-thrower may have first been developed as early as 150,000 years ago. Fragments of atlatls carved from mammoth ivory that date to around 17,000 to 15,000 years ago have been discovered in Europe. Atlatls eventually spread throughout most of the world, before being largely replaced by the bow and arrow. Some communities, including duck hunters living around Mexico’s Lake Patzcuaro and Inuit groups that hunt seals in the Arctic, continue to use atlatls to this day.

Every person who ever used an atlatl for hunting or warfare probably also used it for target practice, and many likely took advantage of the opportunity to show off their skills or compete for status. For the Moche, ceremonial badminton may have served as both target practice and as a form of competition, perhaps not unlike the tournaments that bring together modern-day atlatl enthusiasts. When Henry saw Moche depictions of the shuttlecocks and crosspieces used in the ancient game, he says, “I immediately knew what was going on, and I thought, ‘Oh yeah. I can make those.’”

AFTER A FEW MONTHS of work creating and experimenting with replicas, Donnan and Henry took their ceremonial badminton equipment to the World Atlatl Association’s annual gathering in the Nevada desert in the spring of 2015. Between Donnan’s knowledge of the game and Henry and his fellow atlatlists’ agility with spear-throwers, they quickly worked out the kinks. “It caught on instantly,” Henry says. Most of today’s atlatl sports are individual events, similar in spirit to archery or javelin throwing. This new version of ceremonial badminton, on the other hand, could be played in groups, and it wasn’t a competition per se. Rather, one or two people launched the spears equipped with shuttlecocks—which Henry had made out of wine bottle corks—and everyone else in the group tried to bring them down. No one kept score, and there were no teams.

That day in the desert, as Donnan watched the atlatl hobbyists scramble to snare the shuttlecocks, laughing when they missed and celebrating when they succeeded—which happened far more often than he expected—he realized something that had never occurred to him before. Ceremonial badminton, so long associated with the solemnity of Moche religion, could actually be fun. “To me it’s very human,” says David Anderson, an archaeologist at Radford University in Virginia who studies ancient sports such as the ritual ball game played throughout Mesoamerica. “This is target practice. This is something people have always wanted to do, all over the world, and we still do it

today.” Anderson says that ceremonial badminton was likely taken very seriously by its participants and spectators and certainly had a religious significance. He points out that the Moche could perform important rituals and enjoy athletic contests at the same time. He emphasizes that athletes and fans still participate in rituals related to sports today, from baseball superstitions to tailgate parties. “We mystify that for other cultures, and we presume it’s normal for our own,” he says.

Before helping to re-create ceremonial badminton, Donnan had always thought of Moche ceremonies as somber affairs that were enacted as discrete events. “Now, I have an entirely different perception of activities we see depicted in Moche art,” he says. He believes there were Moche festivals, where ceremonial badminton was performed alongside other rituals such as human sacrifice, accompanied by music, drinking, and feasting—somewhat like the ancient Greek Olympics, a festival that



A feathered object (right) lies on the ground after having been ensnared by an X-shaped crosspiece (left) affixed to a spear tossed during a modern game that resembles Moche ceremonial badminton.

also included a wide variety of religious as well as athletic events.

Donnan still doesn’t know what the precise rules of ceremonial badminton were, or how players won or lost. He doesn’t know what the activity meant or represented in the context of Moche festivals, and he’s not sure that he ever will. One way to learn more about ancient ceremonial badminton, Donnan says, would be to find the tomb of a player buried with the game’s equipment, just as the Lord of Sipan was entombed with the trappings of the sacrifice ceremony. But the ancient game’s rules are likely lost, so it’s up to modern players to create their own. Because Henry and his fellow spear-throwers are sure of one thing: Ceremonial badminton is too much fun to let it disappear again. Now dubbed the “Moche toss,” it’s played by atlatlists across the world. ■

Lizzie Wade is a journalist based in Mexico City.

To see video of ceremonial badminton being played, go to archaeology.org/mochetoss.

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Excavations at the site of Ein Gedi, the largest oasis on the barren and rocky western shore of the Dead Sea, have revealed a village that persisted from the 7th century B.C. to the Byzantine period.



LETTER FROM THE DEAD SEA

LIFE IN A BUSY OASIS

Natural resources from land and sea sustained a thriving Jewish community for more than a millennium

by **SARA TOTH STUB**

The Dead Sea includes the lowest point on Earth, at more than 1,400 feet below sea level, and lies in a long and narrow desert valley that runs through Israel, Jordan, and the West Bank. The sea itself is nearly 1,000 feet deep and covers more than 200 square miles, but its water is too salty to support any life beyond microscopic bacteria. Called a “sea” in multiple languages, including Hebrew and Arabic, this body of water is actually an inland lake, fed mainly

by the Jordan River at its northern end. Green oases of palm trees and freshwater springs dot the land around the Dead Sea, but the terrain is overwhelmingly barren and rocky, with mountains rising along both the eastern and western shores.

Despite the harsh landscape, people have lived alongside the Dead Sea for millennia, drawn in part by the valuable minerals that can be harvested from its water and mud, as well as the maritime transport routes and trade

links it provides. Located just 20 miles from Jerusalem, the Dead Sea has played an important political and economic role in the Near East since at least the seventh century B.C., when boats loaded with salt, bitumen, and crops likely first plied its waters, their cargo destined for Jerusalem, Jericho, and Mediterranean ports. “The Dead Sea gradually becomes this place where people see that they can make a lot of money,” says King’s College London archaeologist Joan Taylor. “The eco-

LETTER FROM THE DEAD SEA

conomic resources, from salt to asphalt to what was grown around it in the oases, are incredibly significant. It's one of the most extraordinary places in the world."

One place where archaeologists have unearthed abundant evidence of people's long relationship with this unique body of water is Ein Gedi, the region's largest oasis, which covers more than 250 acres on the lake's western shore. Here, a team led by archaeologists Orit Peleg-Barkat of the Hebrew University of Jerusalem and Gideon Hadas of Ben Gurion University's Dead Sea-Arava Science Center is uncovering the remains of a Jewish village that thrived for more than a thousand years. As a direct consequence of the rule of a long series of powers, including the Assyrian, Babylonian, Persian, and Roman Empires, all of whom were heavily invested in the village's economy, Ein Gedi's inhabitants reaped the benefits of their unusual environment—a lush oasis with easy access to the Dead Sea's mineral riches. "This may be the most beautiful place in the world," says Hadas, "but it all has to do with the environment and resources. That's

what brings people here."

The 2019 excavation season, which concluded a 16-year-long investigation of dwellings and other structures from the Second Temple and Byzantine periods, built on earlier excavations going back to the 1960s. Those previous digs had exposed remains that date back more than 6,000 years, including an ancient temple, dozens of houses, Jewish ritual baths, a Byzantine synagogue, and agricultural terraces, but also left many questions. During the most recent excavations, the team sought to understand more about the village's economy and trade connections, as well as how it weathered the chaotic last years of the ancient province of Judea and its eventual incorporation into the Roman Empire. Hadas and his colleagues are showing that evidence of the lives of Ein Gedi's ancient villagers are key to understanding how the Dead Sea enriched, supported, and connected those able to prosper on its inhospitable shores.

Today, the ancient village of Ein Gedi lies on the property of an Israeli kibbutz, or communal agricultural settlement, that produces dates and bottles mineral water collected from four large natural springs. These springs first attracted people more than six millennia ago, when a Copper Age farming people known as the Ghassulians, who inhabited the southern Levant between 4400 and 3500 B.C., built a temple here. Perched high on a natural terrace above one of Ein Gedi's springs, the temple

commands a sweeping view of the Dead Sea. In the 4,000-square-foot religious compound, consisting of four stone and mudbrick buildings, archaeologists have found a circular stone structure with a basin connected to a drainage channel. This, along with the discovery of several rocks just outside the complex with holes bored in them, may be evidence of Ghassulian rituals centered on water. After the Ghassulians left in the fourth millennium B.C., their entire culture seems to have disappeared from the region for reasons that remain unknown. The oasis, along with most of the area around the Dead Sea, remained empty of permanent settlers for the next 3,000 years. "We don't know exactly why no one lived around here in that period," says Hadas. "We have no remains to tell us anything other than that it was empty."

In the early seventh century B.C. a group of newcomers built a village of stone and mudbrick houses and workshops on the hillside below the remains of the Ghassulian temple. During the 1960s, Israeli archaeologist Benjamin Mazar of Hebrew University found types of pottery—and identified Hebrew names on personal seal stamps—at the site, indicating that Ein Gedi was an Israelite village. This was the beginning of more than 1,000 years of nearly uninterrupted Jewish life there.

The village was one of several new settlements built east of Jerusalem, then the capital of the Jewish kingdom of Judea and a loyal vassal state of the Assyrian Empire. Settling at Ein Gedi was part of a trend of Judean expansion driven by the need to cultivate more land and ensure the Assyrian rulers access to the Dead Sea and its minerals. The words "for the king" stamped onto many vessels found at the site make it clear that the central government in Jerusalem controlled the economy, which relied on producing dates, grain, and salt.

This theme of settlement and development would continue through





A 4,000-square-foot temple was built in the 4th millennium B.C. by a Copper Age people known as the Ghassulians at a spring above Ein Gedi.

much of Ein Gedi's history. "Whenever the regime in charge is stable, we see that Ein Gedi grows," Hadas says. "Building agricultural terraces, establishing workshops, and finding markets for goods requires investment and connections." Like many areas in Judea, though, Ein Gedi's remains speak to the devastating Babylonian invasion at the end of the seventh century B.C., when King Nebuchadnezzar advanced

from modern-day Iraq and laid siege to Jerusalem and its surrounding areas, adding them to his growing empire. Archaeologists have found a layer of ash from this period at Ein Gedi, evidence that it was at least partially destroyed. Because only part of the settlement has been excavated, though, it isn't clear how thorough the destruction was, or even if Ein Gedi was completely abandoned at this time.

In the sixth century B.C., the Achaemenid Persians, who were based in Persepolis, in what is now Iran, rose to power in the region and conquered much of the former Babylonian Empire, including Judea. Once again, Ein Gedi flourished. Mazar and his team found numerous Achaemenid-

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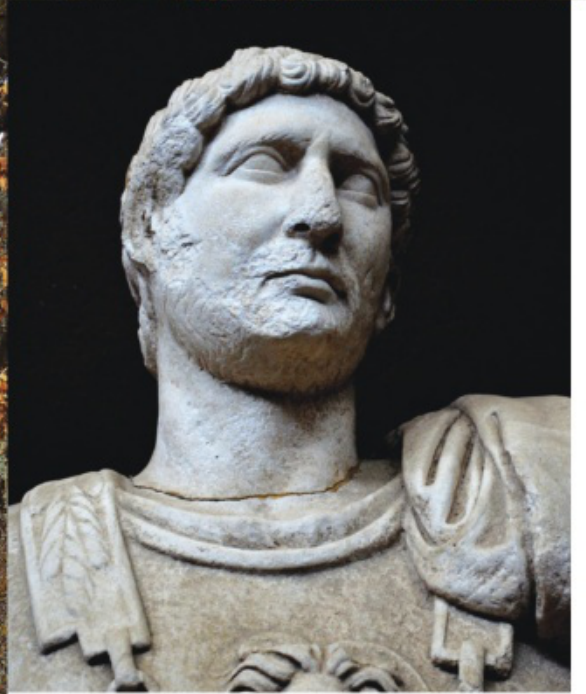
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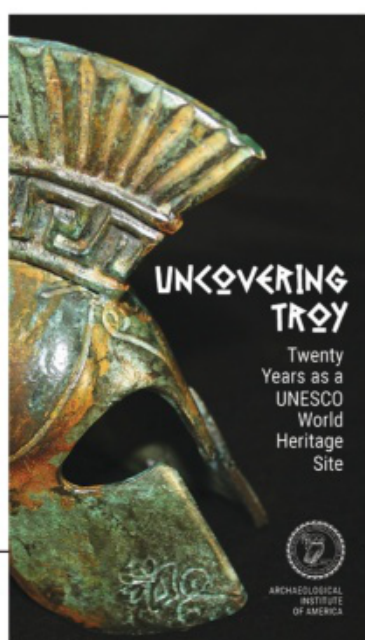


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The AIA thanks Richard C. MacDonald for his generous support of the Year of Troy Project.

LETTER FROM THE DEAD SEA

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era seal stamps on jar handles. It's unclear if the descendants of the original inhabitants reoccupied the settlement, or if it was newcomers who recognized its potential. "We can't say exactly when people returned to Ein Gedi, or if it was the same families that were here before," Hadas says. "But Judea was a relatively small province, and people saw this as a place they could make a living." The villagers appear to have led prosperous lives filled with expensive imported objects including pottery from the Galilee, Jordan, and Greece, and glass pendants carved in the shape of human faces from Phoenicia. There is evidence of the use of Egyptian cosmetics, such as kohl tubes and bronze-trimmed mirrors.

Ein Gedi's residents, however, weren't content to stay on the shores to make their living from the Dead Sea's bounty. Radiocarbon dating of a one-armed anchor Hadas found sticking out of the mud on the lakeshore confirmed that it dates from between



A stone mikveh, or Jewish ritual bath, in the village of Ein Gedi dates to the late 2nd or early 1st century B.C.

the eighth and sixth centuries B.C., far older than the other mainly Roman- and Byzantine-era anchors that have been discovered at or near the site over the last two decades. Offering the oldest archaeological evidence of sailing on the Dead Sea, the anchor likely

belonged to a simple reed watercraft of the type that were used at the time elsewhere in the region, including on the Tigris and Euphrates Rivers, says Asaf Oron of the University of Haifa. He explains this anchor may be proof that, during the sixth century B.C., local people such as the villagers of Ein Gedi first sailed the lake's waters to collect bitumen, which seeps up from the bottom of the Dead Sea and had many uses in antiquity. The mineral was employed across the region as an additive to cement, as waterproof coating for baskets, as paint for decorating vessels, and as an embalming agent in mummification. Archaeologists have found bitumen, sometimes stored in jars, dating from nearly all the periods of Ein Gedi's occupation.

Boats are largely absent on the Dead Sea today, aside from a few tourist and scientific vessels, in part because the area is a military zone and forms part of the international border between Israel and Jordan. But beginning in the sixth century B.C.—or perhaps earlier—and lasting through the



Archaeologists have uncovered standing remains of Ein Gedi dating to the Byzantine period, including numerous houses that were built in clusters around courtyards.

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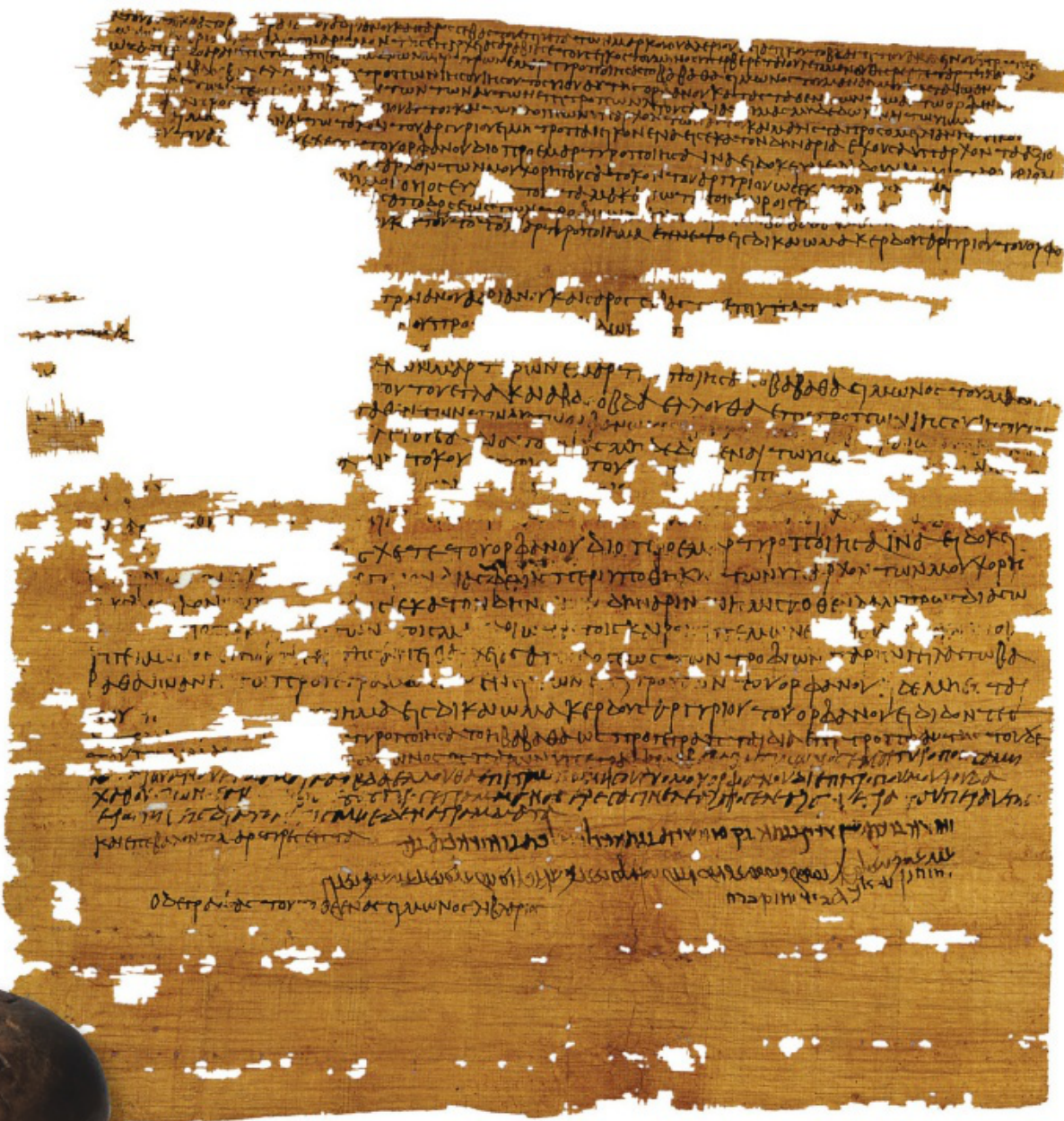
LETTER FROM THE DEAD SEA

(continued from page 60)

nineteenth century, boats were a common feature on the Dead Sea. In fact, the Madaba Mosaic Map, which was discovered in a church in Jordan and dates to the sixth century A.D., depicts two ships loaded with cargo afloat on the lake.

Boats would clearly have been an efficient way to move people and goods across the water or along the shores in areas where overland travel could be dangerous or even impossible given the mountainous terrain rife with canyons, changing water levels, and flash floods. Archaeologists have identified at least eight anchorages around the Dead Sea, many of them located in or near the oases that dot the shores, or near overland trade routes. In periods of political stability going back to the seventh century B.C., this network of anchorages helped transport both utilitarian and luxury items.

Hadas' recent excavations at Ein Gedi show just how much the community relied on the Dead Sea for both trade and transportation. Almost every excavated house in Ein Gedi contains a slab of red sandstone quarried from the eastern side of the lake, which, says Hadas, may have been used as a cutting board or for sharpening tools. Basalt grinding stones found at the site came from the mountainous region of Moab, also across the water, as did many pieces of painted ceramics. "Of course this came by boat," Hadas says. "Why would they put it on a camel and walk all the way around when they can just sail across?" Three stone anchors found on Ein Gedi's shore indicate that larger ships, not just reed boats, were



A papyrus document (above) and an iron house key (left) are some of the artifacts found in the so-called Cave of Letters in the 1960s. Residents of Ein Gedi took refuge in the cave during the Bar Kokhba Revolt, a Jewish uprising against Roman rule that lasted from A.D. 132 to 135.



also in use from at least the third or second century B.C.

The Dead Sea's established trade routes and abundant natural resources spurred the Hasmonean Dynasty, a Jewish priestly family that ruled from Jerusalem from around 154 to 37 B.C., to further develop the area. In the first century B.C., the Hasmoneans made

Ein Gedi a district capital of the province of Judea. Excavations at the site have shown that the villagers expanded farther down the hill at this time, adding more agricultural land and building additional irrigation systems in order to cultivate dates in particular. Archaeologists have also found hints that the Hasmoneans built royal dwellings in Ein Gedi. Several Doric capitals typical of this time period, along with stones carved with rosettes and grape clusters, were reused in the pavement of a later Roman bathhouse just south of the village.

The Romans took control of the area in the mid-first century B.C., after the defeat

of the Hasmoneans by Mark Antony and Herod, and over the next few centuries faced numerous confrontations with local Jewish leaders, including Simeon bar Kokhba, who led a widespread uprising that included residents of Ein Gedi. The Bar Kokhba Revolt ultimately failed in A.D. 135, but, by this time, Ein Gedi was already referred to as a “village of the lord Caesar” in papyrus documents left behind in the so-called Cave of Letters, where dozens of people from the village hid from the fighting between Jewish rebels loyal to bar Kokhba and the Roman military. Some of the papyri Israeli archaeologists found in the cave in the 1960s belonged to a woman named Babata, daughter of Simeon. From documents related to her marriages, divorces, and property ownership, it’s clear that she and her family owned land in Ein Gedi and areas across the water, which had come under Roman control in the second century A.D.

Once again, the region’s central government controlled Ein Gedi’s economy, and once again its residents profited. But a second-century A.D. layer of ash at the site from burning buildings, along with personal items, house keys, and important family documents belonging to the residents of Ein Gedi found in the Cave of Letters, indicate that most of the people who hid there likely did not return to their homes. Nonetheless, Jews continued to live in Ein Gedi under Roman rule, cultivating its fields, and attaining success enough to establish a synagogue in the third century A.D. “You would expect Ein Gedi to go on, because it was of such enormous interest to Rome,” says King’s College London’s Joan Taylor. “It was in everyone’s interest for it to continue.”

By the fourth century A.D., the village had expanded farther into the area where Hadas and Peleg-Barkat recently completed their excavations.



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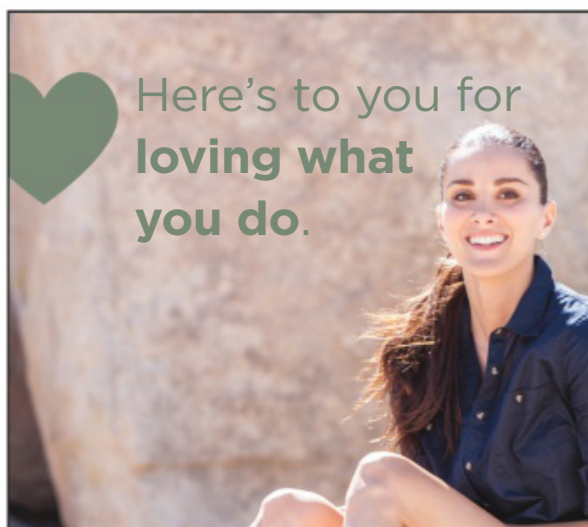


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LETTER FROM THE DEAD SEA

In the 1970s, the archaeologists who discovered the village's synagogue determined that it had been extensively renovated in the fifth century A.D., including the addition of a new floor mosaic decorated with geometric designs and birds, as well as with an Aramaic text forbidding community members from revealing "the secret of Ein Gedi." Hadas can't say for certain what that secret may have been, although many have surmised that the words refer to guarding the trade secrets of the production of balsam, which was of high value in the ancient world for its aromatic and medicinal properties.

Only a century or so after the synagogue was renovated, the settlement at Ein Gedi came to an end. Hadas has documented evidence of a late sixth- or early seventh-century A.D. fire that destroyed it in marks scarring many of the villages' walls and mosaic floors. A hoard of copper coins he found under the floor of a house in 2018 signals that residents may have had to leave so quickly that they didn't



A 6th-century A.D. mosaic known as the Madaba Map is located in a church in Jordan. It shows a cargo-laden ship (top right) on the Dead Sea.

have time to retrieve the cache. Hadas and Peleg-Barkat are not sure why life ended at Ein Gedi, although the community's destruction does coincide

with a period of increasing instability in many parts of the Byzantine Empire, which now controlled the region. Other desert settlements also came to an end at this time.

Archaeologists at Ein Gedi have recovered some remains, including a flour mill and simple dwellings, from when the Egyptian Mamluks ruled the area in the thirteenth through fifteenth centuries. After this, the area again lay empty until a kibbutz was established there in the 1950s. To this day, the Dead Sea's ample wealth remains vital to the economies of the countries that control it. Farmers still grow dates on the coveted oases along the lake's shores, and Israeli and Jordanian chemical companies harvest salt, potassium, and other minerals from the Dead Sea, selling them, much as people did in the past, in markets near and far. ■

Sara Toth Stub is a journalist living in Jerusalem.



A mosaic floor added to Ein Gedi's synagogue in the 5th century A.D. is evidence of the village's continued prosperity into the Byzantine period.



A THANK YOU TO ANN BENBOW

Ann Benbow,
AIA Executive
Director



After five years at the helm of the Archaeological Institute of America (AIA), Ann Benbow is stepping down as Executive Director. Throughout her time at the AIA, Ann has been an inspiring leader. She tackled many of the Institute's most pressing initiatives, including a forthcoming redesign of the AIA's website, and forged new relationships with other learned societies while strengthening relationships already in existence. Ann brought her long experience with and unflagging dedication to outreach and education to the forefront of her leadership. She secured funding from federal agencies for International Archaeology Day (IAD), including multiple years of sponsorship from the National Park Service. In addition, under Ann's guidance, the AIA organized a series of conferences for heritage educators and hosted the first ArchaeoCon, an event where she had the opportunity to share her belief in the importance of archaeology with the public. We sincerely thank Ann for her service, leadership, and vision. She will be greatly missed.

HIGHLIGHTS FROM AN EVENING WITH SARAH PARCAK & JOSH GATES

Sarah Parcak and Joshua Gates in Los Angeles



On February 2, AIA Trustees Sarah Parcak and Josh Gates joined guests in Los Angeles to speak about their shared passion for archaeological discovery and exploration. Parcak is a professor at the University of Alabama at Birmingham, a National Geographic Society Archaeology Fellow, winner of the 2016 \$1 million TED Prize, and founder of GlobalXplorer°. Gates is a member of the Explorers Club and host and co-executive producer of *Expedition Unknown* (Discovery) and *Legendary Locations* (Travel Channel).

Despite a rainy evening threatening to keep people home, almost 300 archaeology enthusiasts of all ages from across the United States—and even some from outside the country—attended the lively exchange

between Parcak and Gates. The two presenters touched on a variety of topics ranging from their own experiences in the field to the use of technology in archaeology. Both also spoke to the importance of the human story in all its forms and about their efforts to make archaeology more accessible to the public. The event was extremely well received, and the AIA wishes to thank all those who gathered for the evening.

Sponsored by Discovery, with special thanks to: AIA Trustees Joshua Gates and Sarah Parcak, AIA Trustees Elizabeth M. Greene, Barbara Meyer, and Thomas Sienkewicz, Lynn Dodd, Professor, University of Southern California, Valeri Vasquez, Bovard Auditorium

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AIA programs and activities presented in "Dispatches from the AIA" are made possible through membership dues and gifts from generous donors. The AIA uses these resources to continue its mission of supporting archaeological research, preserving sites around the world, promoting outreach, and making the world of archaeology accessible through its publications and websites. We urge you to join the AIA and support the Institute's efforts to understand, protect, and promote our shared cultural heritage at archaeological.org/join.



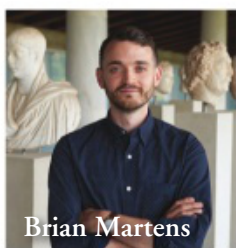
DISPATCHES

FROM THE AIA

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AIA SELECTS 2019–2020 GRANT WINNERS

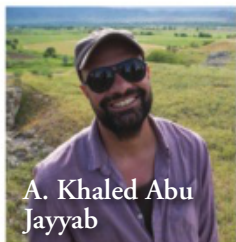
Each year the AIA awards a variety of grants to support archaeological research and site preservation. We are pleased to announce our most recent winners.



Kathleen and David Boochever Endowment Fund for Fieldwork and Scientific Analyses

This grant was awarded to Brian Martens,

Postdoctoral Fellow in the Department of Greek and Roman Art at the Metropolitan Museum of Art. Martens will use a variety of scientific techniques to trace the sources of marble used by sculptors in Roman Athens. This research will allow Martens to reconstruct trade networks and produce a more complete picture of the creation and diffusion of art throughout the Mediterranean basin in the Roman period.



Julie Herzig Desnick Endowment Fund for Archaeological Field Surveys

This grant was awarded to A. Khaled Abu Jarryab,

Department of Near and Middle Eastern Civilizations, University of Toronto. Abu Jarryab will conduct an archaeological survey in the Middle Kura Valley, in southeastern Georgia's Gardabani, an area that is relatively unknown in terms of archaeological research. The survey will document sites in the region using a predictive model developed by Abu Jarryab and his team.



Richard C. MacDonald Iliad Endowment for Archaeological Research

Grants were awarded to Kim Shelton, Associate Professor and Director of

the Nemea Center for Classical Archaeology at the University of California, Berkeley,



Florence Gaignerot-Driessen

and Florence Gaignerot-Driessen, Director of the Anavlochos Project of the French School at Athens and Lecturer in Archaeology at the Institut Catholique de Paris.

Shelton will explore how Mycenaean mortuary practices and ancestor worship were adopted beyond palatial sites throughout the Bronze Age by studying materials recovered from the Bronze Age cemetery at Aidonia, Greece. Gaignerot-Driessen will examine data gathered from tumuli at the Early Iron Age cemetery of Anavlochos in eastern Crete to address the topic of tumuli as emblematic monuments in Homer's *Iliad*. The Anavlochos tumuli are especially significant as they are the first Cretan examples of this type of funerary construction.



Kate Liszka

Ellen and Charles Steinmetz Endowment Fund for Archaeology

Kate Liszka, the Benson and Pamela Harer Fellow in Egyptology at

California State University, San Bernardino, was awarded a grant for the Wadi el-Hudi Expedition. Since 2014, Liszka's team has been surveying and excavating ancient fortified settlements and mines in Egypt's eastern desert. The imminent destruction of the archaeological heritage in the area by new gold mines has forced the team to accelerate the pace of their research. Liszka and her team have developed a technique for ground-based photogrammetric survey using multiple cameras mounted on poles to rapidly finish surveying the standing architecture, rock inscriptions, and other archaeological remains in the area.

Conservation and Site Preservation Grant

This grant was awarded to codirectors Pearce Paul Creasman, Associate Professor

in the College of Science at the University of Arizona, and Meghan Elizabeth Strong, Research Associate at the Cleveland Museum of Natural History and Adjunct Assistant Professor at Case Western Reserve University, for their work at the Royal Pyramids at Nuri, Sudan.

Nuri is threatened by encroachment, urbanization, and environmental change. Creasman and Strong plan to implement a preservation strategy that includes constructing a low brick wall around the majority of the site, installing signage in English and Arabic, and building a protective enclosure for the tomb of Queen Yeturow to protect it from the elements. The project will include outreach efforts such as familiarizing local workers with the history of the site, providing organized tours to students and local children, and developing a version of the AIA Guide to Best Practices for Archaeological Tourism specific to Sudan.

To learn more about AIA-supported site preservation projects, visit archaeological.org/sitepreservation.

AIA GRANTS AND AWARDS DEADLINES

AIA grants, fellowships, and scholarships support the efforts of researchers and students around the world. Additionally, the AIA acknowledges the achievements and contributions of archaeologists, educators, authors, and others at the Institute's annual awards ceremony. To be eligible for AIA grants and fellowships, applicants must have been members of the AIA for at least two consecutive years (one year for students) by the application deadline. To learn more about AIA fellowships and grants please visit archaeological.org/grants. Information on AIA awards is available at archaeological.org/awards.

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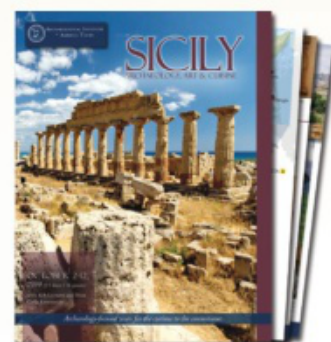


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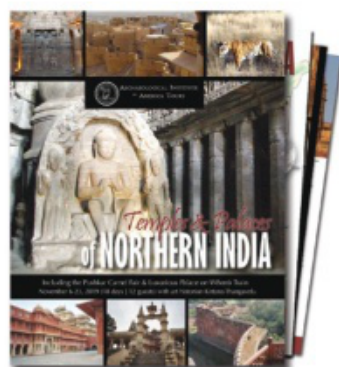
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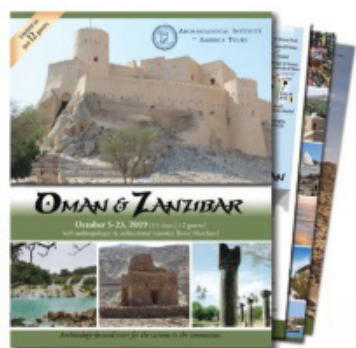
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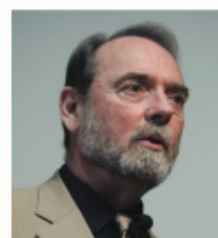


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Trevor Marchand

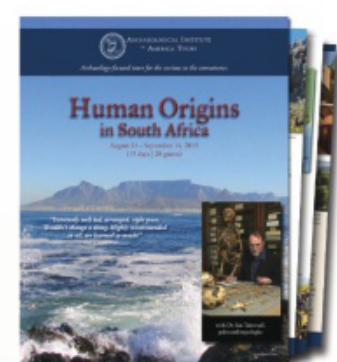


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Ian Tattersall



Marvel at this multifaceted country's landscapes and vineyards, early human sites, wildlife parks, cosmopolitan cities, and more. Highlights include Sterkfontein and Pinnacle Point Caves; and two nights at a luxurious camp to explore Kapama Game Reserve.

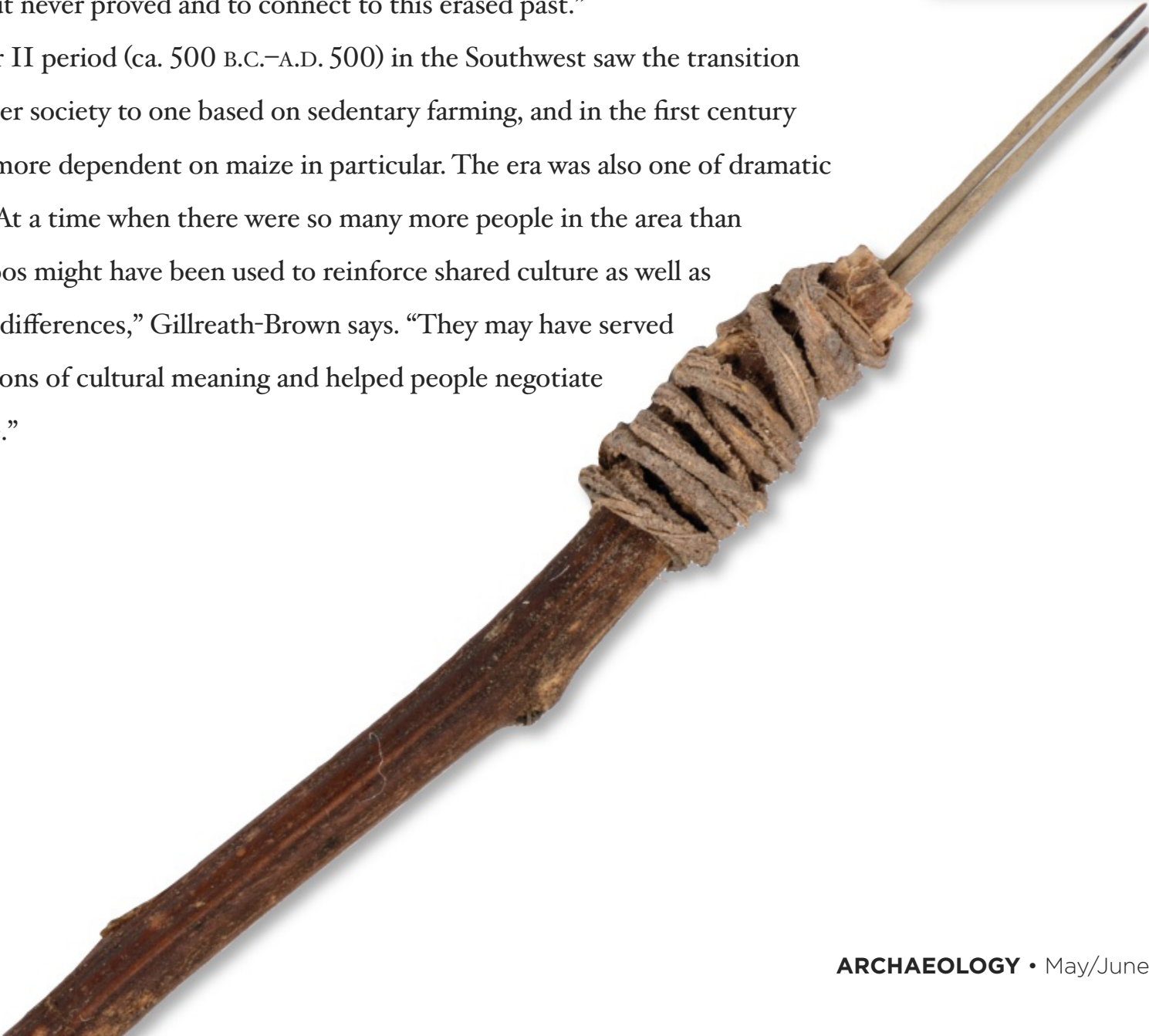
For thousands of years and across much of the world, tattoos have been markers of identity used, for example, to make statements about gender, ethnicity, and status, but evidence for tattooing among the indigenous cultures of the American Southwest is rare. There are no identifiable tattoos on excavated human remains from the region, and while some scholars believe that images on rock art, clay figurines, and kiva murals represent tattoos, others suggest they may depict body painting. “These all provide potential indirect evidence for ancient tattooing,” says archaeologist Andrew Gillreath-Brown of Washington State University. Furthermore, he explains, it is thought that, however murky its history, tattooing in the Southwest was abandoned after European contact. “Colonial institutions looked down on tattooing and other forms of non-Christian, indigenous cultural expression,” Gillreath-Brown says. “Knowledge of traditional tattoo patterns, tools, and meanings all declined as indigenous people were stripped of their lands, language, and culture.”

Thus, Gillreath-Brown was thrilled when, while sorting through the last of 64 storage boxes from excavations of the early Ancestral Puebloan site of Turkey Pen, he found an artifact he soon identified as a 2,000-year-old tattooing tool. “This is the first object to substantiate what was believed but never proved and to connect to this erased past.”

The Basketmaker II period (ca. 500 B.C.–A.D. 500) in the Southwest saw the transition from a hunter-gatherer society to one based on sedentary farming, and in the first century A.D. people became more dependent on maize in particular. The era was also one of dramatic population growth. “At a time when there were so many more people in the area than there had been, tattoos might have been used to reinforce shared culture as well as to point out cultural differences,” Gillreath-Brown says. “They may have served as visual representations of cultural meaning and helped people negotiate a changing landscape.”

WHAT IS IT
Tattoo needle
CULTURE
Ancestral Pueblo, Basketmaker II period
DATE
A.D. 79–130
MATERIAL
Sumac handle, yucca binding, prickly pear spines, pigment
FOUND

DIMENSIONS
3.92 inches long, 0.16 inches wide at the widest point





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